

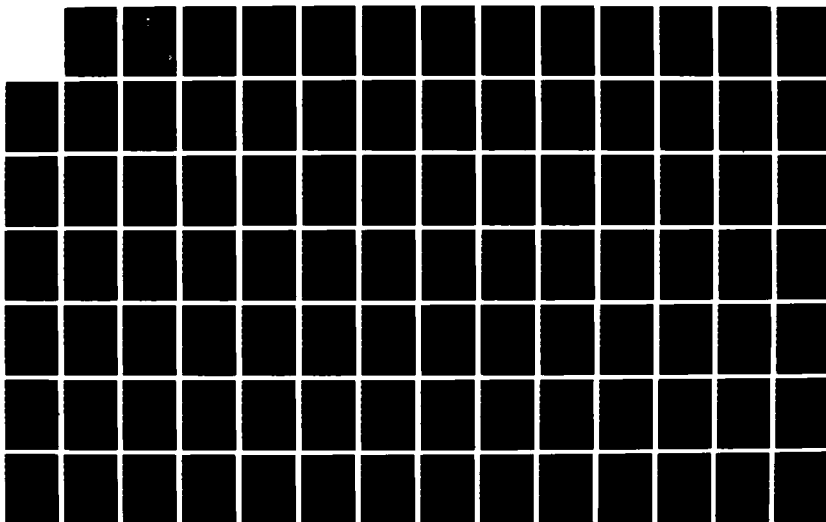
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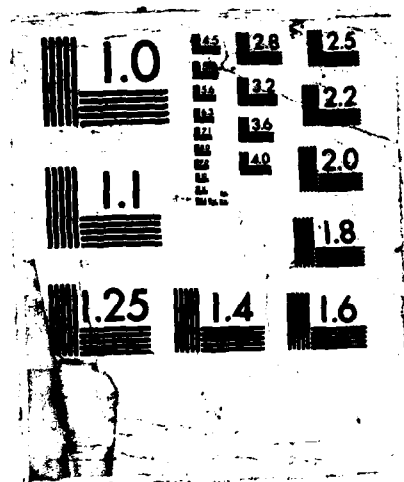
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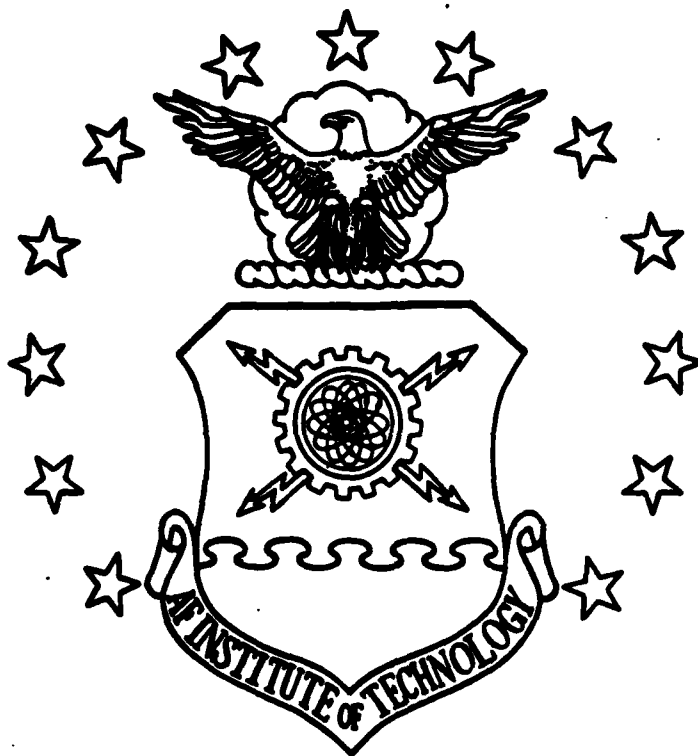
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Jerry C. McDaniel
Captain, USAF

AFIT/GLM/LSMA/87S-47

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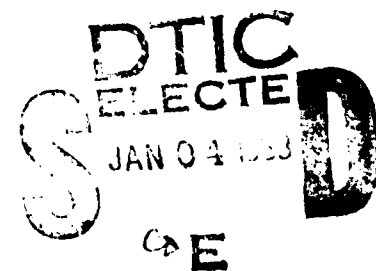
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**AIR BASE GROUND DEFENSE WARGAME:
STUDY OF A SECURITY POLICE TRAINING DEVICE**

THESIS

**Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management**

**Jerry C. McDaniel, B.S.
Captain, USAF**

September 1987

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Preface

I undertook this study because of my personal interest and experience in ABGD operations. Realizing that AFOSP had an initiative to develop a wargame as a training device, I felt that it was important for someone with experience in ABGD to identify some of the critical variables that should be considered in developing combat realism into such a game. I feel that this study has achieved that goal. I hope it will be useful to AFOSP during the development of the ABGD wargame.

In researching and writing this thesis I had a great deal of help from other people. I am deeply indebted to Lt Col Robert J. Lekarczyk of AFOSP who helped me develop the topic and provided assistance throughout the endeavor. I also wish to thank Captain Matt Caffrey of the Nellis Wargames Club, Regan F. Carey of the University of Nevada, Bill Gibbs of Omega Games, Captain Jim Holland of the Aberdeen Proving Grounds, Steve Baker of Aeronautical Systems Division, TSGT Larry P. Miller of MAC's Volant Scorpion ABGD Training and Evaluation Area, and Captain Randy Felts of the 2750th Security Police Squadron for their assistance. A special note of thanks to my faculty advisor, Lt Col Paul A. Reid. His guidance and continuing patience, particularly in the final hours, contributed greatly to the success of this endeavor.

I especially wish to thank my wife, Vone and my children, Justin and Elizabeth, for their understanding and concern, despite personal sacrifices during the research and writing of this thesis.

Jerry C. McDaniel

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ABSTRACT

This study explored the possible use of a board wargame as a device for training Air Force Security Police (SP) air base ground defense (ABGD) forces. The study had three objectives: (1) Determine current SP combat missions and the types of threat forces they are likely to engage. (2) Determine the nature, components, and uses of wargames. (3) Identify the variables needed to model ABGD combat effectively.

Soviet and US operational doctrine and tactical concepts were analyzed to examine the potential future combat environment in which ABGD forces may have to operate. Components of wargames and game design systems were reviewed to determine those that needed to be included in a successful game design. A historical examination of wargames determined that wargames have been successfully used in the past for training and testing of operational plans. These two phases were integrated, and an analysis identified tactical implications pertaining to the threat forces that ABGD forces may be facing in a future conflict. The review also identified game design

considerations that would inject reality into the simulation device.

This study concluded that a wargame can be an effective training device if designed properly. The first step in a successful game development process is identification of the proper variables in the combat environment to be simulated. These variables must then be translated into game design language which will yield the required effects to simulate modern combat. This part of the process includes all the considerations which ensure the game is played properly and is interesting to the players. The more realism depicted in a game, the more complex the game is. The balance between warfighting realism and game playability was found to be crucial.

I. Introduction

Background:

The Security Police (SP) career field is currently assigned four basic missions; law enforcement, corrections, security and air base ground defense (ABGD) (22:2-2 to 2-4). In the law enforcement mission, members of the career field provide protection for United States Air Force (USAF) resources and maintain law and order on Air Force installations (22:2-3). To accomplish this mission, members perform duties in motor vehicle traffic control, on and off base patrols and the investigation of offenses, incidents and traffic accidents (22:2-3). In the corrections mission, members of the career field provide the administration and operation of detention facilities and management of Air Force prisoners (22:2-3). To accomplish this mission, members supervise the operation of detention facilities, perform escort duties, supervise work details, and guard prisoners (22:2-3). In the security mission, members of the career field provide protection for operational resources (combat ready weapon systems) and support equipment, material, and facilities from sabotage, espionage, subversion, and attack (22:2-2). The duties required for this mission include a series of static posts in conjunction with foot and mobile patrols around and within the areas that contain operational resources such as

aircraft and associated equipment, missiles, nuclear weapons, and elements of command and control systems. The air base ground defense (ABGD) mission is a wartime tasking in which members of the career field actively defend Air Force bases in hostile environments against attack by enemy ground forces (22:2-3 to 2-4).

The wartime mission is performed by mobilizing elements or teams from different security police (SP) units and bringing them together at the base to be defended (21:5). These teams are organized and equipped based upon specific ground combat needs and fall into the following categories: Air Base Ground Defense (ABGD) Flight, Heavy Weapons Section and Air Base Ground Defense Squadron Headquarters (19:13). The basic fighting unit is the Air Base Ground Defense (ABGD) Flight which consist of 44 personnel and is composed of a six person headquarters element and three thirteen person squads (19:13). The headquarters element consists of the Flight Leader, Flight Sergeant, and three Radio-Telephone Operators (RATELO's). Each of the squads consist of a squad leader and three four person fire teams (19:13). The Heavy Weapons Section is composed of separate teams organized based upon specialized training in the use and employment of specific ground combat weapons that are not organic (or assigned to) the ABGD Flights. The individual teams are 81 millimeter (mm) mortar teams and fire direction centers (FDC), 90mm recoilless rifle teams and 50 caliber machine gun teams

(19:14). An Air Base Ground Defense Squadron Headquarters serves as the basic tactical headquarters which plans, coordinates and controls the ground defense effort at the respective air base (19:15-16). It consists of a headquarters squadron administration (S1) branch, an operations (S3) branch, and a logistics (S4) branch. In a wartime tasking, these ABGD forces are brought together to form squadrons or groups with the actual size depending upon the location of the air base, the current threat and the tactical situation.

Specific Problem:

During peacetime, security police (SP) personnel primarily perform law enforcement or security duties. The ABGD wartime mission requires a completely different set of skills than those the personnel perform or use to complete the law enforcement or security missions. Consequently, they have to be trained in combat related tasks such as individual battlefield techniques, use of different and/or specialized weapons and equipment, tactical movement, preparation of fighting positions, patrolling, and tactical operations (29:4-6). Based upon the author's personal experience, the daily required law enforcement and security posts and patrols (daily posting requirements) make it extremely difficult to release personnel from normal duties and allow them to train in wartime skills. This often results in training deficiencies.

Combat training deficiencies for ABGD forces have been noted in numerous after action reports from Joint Chiefs of Staff (JCS) and Major Air Command (MAJCOM) directed exercises. Lieutenant Colonel Lekarczyk, Chief of the Doctrine and Policy Branch at the Air Force Office of Security Police (AFOSP) stated during a telephone interview that the training problem is widespread (61). He also stated an initiative has been developed that when implemented will correct this problem. This initiative was based on the results of an Air Force Salty Demo report which recommended the Air Force Office of Security Police (AFOSP) develop a model to train SP ABGD forces for their combat roles. Colonel Lekarczyk related that AFOSP's position is that a computer simulation model would not be a very effective training device since only a small portion of the base (or defense posture) would appear on the computer screen at any one given time. This is an important deficiency because it is speculated that in future conflicts multiple ground attacks will occur in tandem at different locations of the air base under siege. Therefore, AFOSP supports the development of a board wargame training device to compensate for the deficiency of a computer simulation package. The wargame will be used to train security police leaders and enhance their abilities to make combat management decisions.

A wargame is a game device that simulates a conflict or battle between two opposing forces (65:1-2). Wargames

consist of four basic components; a playing surface, the playing pieces, a set of rules, and the players. The playing surface represents the terrain or area where conflict or battle occurs. A hexagonal grid is superimposed on it to regulate movement and positions of units (38:12-15). The playing pieces represent the combat units that are engaged in battle and can take the shape of markers or miniature soldiers and military equipment (48:13). The rules guide the playing action and control the movement and combat effects of the two opposing sides. The rules usually include a Terrain Effects Chart and a Combat Results Table (38:15-17). The Terrain Effects Chart relates the effects of various types of terrain on movement and combat interaction (38:15-17). The Combat Results Table is a probability table that establishes a combat value ratio based upon the assessed strengths of the various units (38:15-17). The players can be individuals or teams of several individuals.

Wargames offer a number of benefits to the players. They encourage creative and innovative problem solving, reinforce knowledge previously learned and evaluate an individual's understanding of newly presented material. Wargames allow the players to gain a better understanding of one's opponent by playing the adversarial role, and more importantly they allow the players to make decisions and learn from their mistakes without suffering the realities of bad combat decisions (58:22-23).

Specific Research Objectives:

The purpose of this study is to explore the specific issue of whether or not a board wargame training device is applicable to training security police combat elements. If so, then what type of variables should to be incorporated into the device. To accomplish this study, three distinct research objectives have been developed.

The first objective is to develop a basic understanding of the security police combat mission. This will be accomplished by determining the current operational doctrine, the specific combat missions assigned to ABGD forces, and the types of enemy ground forces that they are likely to engage.

The second research objective is to obtain an understanding of war games. This will be accomplished by determining the nature and composition of war games, their uses and the variables or factors required to make a war game effective.

The third objective is to integrate the results of the two previous research objectives. The purpose of this objective will be to determine if the combat mission requirements of ABGD forces can be translated into a wargame and serve as a viable training tool. If so, the variables that are needed to make the game design a successful training device will be identified.

Specific Research Questions:

To facilitate the accomplishment of the goal of this study, research questions have been developed for each of the research objectives:

1. Objective #1 - Security Police Combat Mission:

- a. What is the current operational doctrine?
- b. What are the specific combat missions of the security police given the current operational doctrine?
- c. What type of ground forces are security police personnel likely to engage?

2. Objective #2 - Wargames:

- a. What is the nature and composition of war games?
- b. What are the purposes and uses of war games?
- c. Can war games be used effectively for training purposes?
- d. What are the required factors/variables that are needed to make a wargame effective?
- e. Have board wargames proven to be effective methods of training in the past?

3. Objective #3 - Integration:

- a. Can the current operational doctrine and the combat roles of security police forces be incorporated into a war game?
- b. How can factors like weapons used by threat and friendly forces, terrain features, logistic concerns,

fire and maneuver, camouflage and concealment, and command, control and communications be incorporated into a wargame?

c. What is the best possible method of play to maximize training benefits?

Research Limitations

This study was limited to unclassified materiel and documents due to a limited capability for the storage and processing of classified information.

II. Research Methodology:

This study was conducted in three distinct phases which correspond to the three research objectives.

Phase I:

The objective of this phase was to determine current operational doctrine and the specific combat missions assigned to ABGD forces and to identify the types of ground forces they are likely to engage. This was accomplished by determining the potential combat environment that ABGD forces may have to operate in during a future conflict. Since the United States (US) and the Soviet Union train military forces of other countries, it can be assumed that the opposing forces will use tactics, organizations and equipment supplied by or patterned after the Soviet Union (26:2-1). The objective of this phase was achieved in three steps.

In the first step, a review of the appropriate literature describing the current operational doctrine and tactical operations of the Soviet Union was accomplished. This analysis revealed some important elements for consideration in modeling opposing forces in a wargame. Some of these elements included the types of forces that pose the largest threat to air bases and their respective

tactical operations which are guided by the Soviet view of war. This analysis is contained in Chapter 3.

The second step of this phase involved a review of appropriate literature describing the current operational doctrine and tactical operations of the United States (US). This analysis served to establish the US perspective on the potential combat environment in a future conflict. This step involved an analysis of the AirLand Battle doctrine and concentrated on Rear Operations because this is where air bases will be located in any future conflict. This analysis is contained in Chapter 4.

The last step in this phase involved a review of appropriate literature describing the operational doctrine and tactical operations of air base ground defense (ABGD) forces. This analysis served to examine the employment of ABGD forces in their role of defending an air base. The analysis revealed some current changes in doctrine and implementation that will need to be modeled into any future ABGD wargame. This analysis is contained in Chapter 5.

Phase II:

This phase was designed to obtain an understanding of war games. The objective of this phase was to examine the nature and composition of war games, their various uses, their viability as training devices, and to identify the variables or factors required to make a wargame effective. This phase was conducted in two steps.

The first step included a review of the appropriate literature pertaining to wargames. The analysis examined the characteristics of and elements that make up the composition of wargames. Additionally, the analysis reviewed the historical development of wargames, their playing mechanics and the methods of play, and it explored the advantages and disadvantages of wargames. The use of wargames as a training device was also addressed in this review. This analysis is contained in Chapter 6.

The second step of this phase involved a review of the appropriate literature pertaining to wargame design. This analysis examined the development of the game map and a number of systems that are incorporated into the wargame to simulate the elements of combat. Among these systems were the map scale, movement and combat systems, the supply system, the intelligence system, and the playing sequence. This analysis is contained in Chapter 7. Part of the analysis was a review of a number of commercial wargames available on the market. Eight games were identified as having application to this study due to their use of modern weapons and the modeling of some of the types and sizes of forces required for an ABGD game. The review of those eight wargames is contained in Appendix C.

Phase III:

This phase of the research study was designed to integrate the two previous phases. The basic objective was

to determine if the combat mission requirements of the ABGD forces can be translated into a war game. The first step of this phase was too identify some of the prominent tactical implications from an analysis of Chapters 3 through 5. Many of these implications will have to be incorporated into the design of any future ABGD wargame. The second step in this phase was to identify many of the variables that would need to be modeled in an ABGD wargame. Most of the variables were extracted from discussions in Chapters 6 and 7. The analysis of this phase is contained in Chapter 8.

III. The Soviet Threat

Soviet Beliefs

According to Soviet Military doctrine, enemies of the Soviets are the capitalist states, imperialism and aggressive military-political blocs (9:13). In the Soviet's view "war is simply the continuation of politics by other (i.e. violent) means " (63:Vol 21,219). The Soviets believe war will occur between opposing social systems or between classes such as the case in revolutions. Lenin espoused that the class character of politics also determined the class nature of war when he wrote, "The policy which a given state, a given class within that state, pursued for a long time before the war is inevitably continued by that class during the war" (63:Vol 24, 400).

The Soviet style of war and Soviet peacetime preparation are guided by several instrumental beliefs about the nature of the next conflict. They believe the next war will be one of survival involving nuclear, chemical, and conventional weapons. This gives rise to their preoccupation with civil defense (9:17). The Soviets believe that "the only good defense is a good offense." (9:17). This guides their emphasis on offense as the preferred method of war. The Soviets also believe the next war will start from either a surprise attack or an

escalation of a local conflict; therefore, they feel there will not be enough time to mobilize forces and equipment to meet the requirements of future combat (9:17). To the Soviets, this particular belief means it is imperative to manufacture and stockpile military equipment and materials during peacetime so as to be prepared for the possible outbreak of war.

Instrumental to the Soviet concept of war is an emphasis on the offensive as the only decisive form of warfare for the USSR (35:34). This emphasis is rooted in a strong belief that if a war is to be fought it must be fought on someone else's territory (9:117) and be won with the least cost to the USSR (9:90). The Soviets believe the only way to accomplish this objective is through offensive actions designed to destroy the enemy's forces and seize important territory (9:90, 117). The Soviets do not feel that pushing enemy forces back and conquering territory is sufficient. These actions do not preclude the enemy's regrouping and counterattacking Soviet forces (35:34). In the event of war, the basic Soviet aim will be to conclude the war as quickly as possible in order to reduce risk to the USSR homeland (35:9).

An offensive spirit has been apparent in Soviet strategic thinking from the very early days of the Communist Party's accession to power (37:64). In 1927, V. K. Triandafillov introduced and discussed the concept of "Deep Operations" in his book, The Basic Character of

Operations of Modern Armies (37:64). This indicates that very early the Soviets were convinced of the value of achieving a quick and total victory through offensive actions designed to maximize the shock to the enemy's political and military systems. The advent of nuclear weapons has only increased the importance of this strategy to the Soviets (37:64). The Soviets feel that if a modern war against a powerful and sophisticated enemy possessing nuclear weapons is to be won at all, it must be won quickly; and this requires a strong offensive capability (37:64).

Soviet Military Doctrine

Soviet military doctrine is the political policy or officially accepted view of the Communist party with regards to the nature of modern wars, the use of the armed forces, and the readiness preparation requirements for Soviet forces (41:51). Soviet military doctrine provides a guideline for the structuring of the armed forces and the allocation of industrial resources and outputs, and it orients research and development in support of the armed forces (41:51). The primary inputs for the formulation of Soviet military doctrine are political, technical, and military (41:51; 9:15).

Soviet military doctrine has adopted an offensive capability as the decisive means of warfare (5:84; 6:43; 9:15). The doctrine does not require Soviet forces to

strike the first blow; however, once hostilities begin Soviet forces are to act in the most offensive manner possible to defeat the enemy (5:84-85). Current Soviet military doctrine supports the contention that offensive operations are best achieved through a combined arms force (5:85). To facilitate the success of offensive operations, Soviet military doctrine espouses the need for forces to disrupt the enemy's rear area and to capitalize on enemy weaknesses through maneuver (6:51). In the Soviet scheme of offensive operations, depth is added to the battlefield by the use of airborne and airmobile troops. These forces are used to seize key objectives in the enemy's rear area which will facilitate the forward advance of the main forces (9:104).

Soviet military doctrine recognizes that there will be times when units or formations will have to assume a defensive posture. However, it is stressed that it is a temporary measure to either help the attack elsewhere or to prepare the units to resume the offensive (34:37). In the event that a defensive posture is required, the defense will be conducted as actively as possible (34:37). Soviet forces will secure critical terrain and locations with the aim of halting the attack of a superior enemy force and then inflicting severe losses on that force (9:124). These actions will create favorable conditions for resuming the offensive.

Soviet Military Science

Soviet military science provides a portion of the inputs that guide the formulation of Soviet military doctrine. Soviet military science is defined as a system of knowledge concerning the nature of, the preparation for and the waging of armed conflict in the interest of the defense of the Soviet Union (9:19; 5:82). Soviet military science is composed of six branches: military organization, military training, military history, military geography, military technology and military art (9:20).

The Soviets hold the belief that battles and campaigns are won or lost not by chance, but for identifiable reasons (5:82). Based upon this belief, the Soviets feel that organized study, particularly of military history, will reveal patterns which will provide insight into the objective laws regarding the nature of combat (5:82). These laws are not viewed as being permanent, but are viewed as being subject to modification during the course of historical evolution.

Military art is the most important component of Soviet military science (79:70) and it addresses the actual forms and methods of engaging in armed conflict (9:22). It is comprised of three levels of warfighting capability: strategic, operational art, and tactics (79:70; 9:22).

Military strategy is the highest level of military art and deals with the preparations for war and the planning and conduct of armed conflict (9:26; 79:70). Strategy

defines the overall purpose or political goals of the military operations (9:244). The operational level of military art provides a link between strategy and tactics (9:27). This level is concerned with the preparations for and conduct of combat operations by fronts and armies whose combined actions contribute to the successful accomplishment of strategic goals within a particular theater of war (79:52). Tactics govern the preparations for and the conduct of combat operations at division level and below (9:28). Tactics describe the actual methods in which physical force will be used on the battlefield to achieve the goals set forth by the commander at the operational level (9:244).

Principles of Soviet Military Art

The principles of Soviet military art define the principles or tenets of armed conflict that Soviet military leaders consider to be the most important guidelines for conducting military operations (9:25). These principles of military art have their origin in prescribed strategy, from an exhaustive study of the Great Patriotic War (World War II) and subsequent minor wars, and from empirical analysis of the effects of new weapons on the nature of combat (34:34). There are currently eleven principles of military art recognized by the Soviets:

Continuous High Combat Readiness of all Organizations, Units, and Commands. This principle stresses combat

readiness through training, maintenance, and discipline. The emphasis on military readiness is a theme that runs throughout Soviet military writings and is a logical result of historical experience with numerous invasions and defeats by stronger hostile neighbors (9:23). Combat readiness is viewed through two parameters; the need to maintain a large, well equipped, professional military establishment and the need for established military plans and procedures to meet possible contingencies (9:23,29).

Mobility and a High Tempo of Combat Operations. This principle is complementary to the offensive emphasis of Soviet military doctrine. It teaches that future battles will be dynamic in nature and that the speed of advance will be a key indicator of success (9:23). It stresses that commanders should continuously strive to achieve and retain the initiative and that fast moving formations are difficult to target. This is a particularly important aspect given the current threat of nuclear weapons. A rapid advance will force the enemy to constantly move his nuclear means and disrupt his associated logistics, command and control, and intelligence gathering activities (9:23, 29-30; 34:34).

Surprise in Actions. This principle teaches military commanders to gain the advantage by doing the unexpected and by subjecting the enemy to an unbearable level and duration of violence. Soviet military writings place strong emphasis on the element of surprise along with

deception and secrecy (34:36). The Soviets believe that surprise is best achieved through speed, mobility and violence of actions (9:30).

Coordinated Employment of all Branches of the Armed Services in Battle. This principle embodies the essence of the Soviet concept of combined arms battle (9:30). Soviet military doctrine holds that this principle is a vital requirement for victory in modern battle (9:30) with each military branch contributing its strengths to compensate for the other's weaknesses (34:41). This principle implies unity of command with one single commander appointed for any joint operation and the assignment of all branches involved with the operation under his operational control (9:23).

Concentration of Main Efforts. This principle is a restatement of the universally accepted principle of mass (9:30). The Soviet application of this principle includes the variables of quantity, mass, quality, firepower, mobility and time, all focused upon a single location (9:30). The Soviets feel that the traditional massing of men and material can no longer be accomplished since it poses a lucrative target to enemy nuclear fires (34:35). However, concentration is viewed as a matter of time rather than physical spaces, with the concentration occurring so fast that the enemy has no time to organize a nuclear or conventional counterstrike or concentration of forces (34:36).

Comprehensive Security of Combat Activity. This principle encompasses the Soviet use of active and passive measures to secure their own operations from hostile interruptions (9:30). Active measures include air and ground reconnaissance of enemy forces and activities, radio-electronic warfare to disorganize enemy communications, and electronic intelligence collection (9:30). Passive measures include rear area security and the effective use of camouflage, cover, and concealment (9:30).

Preservation of Combat Effectiveness. The Soviet concept of intensive combat will rapidly deplete supplies and forces (9:25). Therefore, a primary concern to Soviet commanders will be resupply and reconstitution of forces. Combat plans should include procedures to achieve these objectives (9:25). While the Soviets are prepared to accept large casualty rates due to their concept of operations, they perceive that the overall loss rate will be considerably smaller as subsequent echelons reap the benefits of the sacrifice of the first (34:39). In recent years the Soviets have also achieved great improvements in their logistics services and stock levels (34:40).

The Simultaneous Destruction of the Enemy to the Entire Depth of His Deployment. This principle stresses the Soviet belief that future battle will be characterized by rapid maneuver, violent execution, and intensive combat on a deep battlefield which will lack clearly defined front lines (9:24). In order to quickly destroy their enemy,

Soviet military doctrine places an emphasis on combat operations in the enemy's rear area (9:24; 34:42). This principle directs Soviet military commanders to penetrate rapidly into the enemy's depth in order to crumble his defense from within (34:42). Targets in the enemy's rear will include nuclear delivery means; command, control and communication facilities; air defense weapons and facilities; logistical support centers; and any other areas considered to have political, economic and military significance (34:42-43).

Conformity of the Goal of the Operation. This principle requires subordinate commanders to carry out the spirit and letter of the plan of their superiors (9:24). In Soviet military terminology "initiative" does not imply revising intermediate steps to meet changed circumstances; it means finding ways to execute the plan as written in spite of difficulties (9:24).

Exploitation of the Moral-Political Factor. This principle requires Soviet military commanders, particularly at the operational level, to make extensive use of propaganda to motivate troops and to use psychological warfare to demoralize enemy troops and populace (9:24).

Strict and Uninterrupted Leadership. This principle stresses that Soviet commanders are expected to exercise detailed supervision over subordinates to ensure that plans are properly executed in a timely manner (9:24). Soviet military operations do not include mission-type orders

which would allow subordinate commanders wide latitude in the conduct of military operations (9:24).

Offensive Tactical Operations

Concepts for Conduct of the Offense. Soviets consider three basic concepts for the conduct of the offense; exploiting faults, attacking weaknesses, and attacking strength (9:90). The particular method of offense used in a given situation depends upon the actual battle situation at that time and location (9:90-91). Soviet military doctrine stresses that conditions favoring any of the concepts can be created or improved by the use of weapons of mass destruction: nuclear, chemical and biological (9:92).

Exploiting Faults. This concept of offense refers to any opportunity created by the weather, terrain, enemy error, or the combat situation which allows Soviet forces to strike a damaging blow to the enemy without risking decisive engagement or defeat (9:91). This would allow Soviet forces to gain the initiative and force the enemy to think defensively.

Attacking Weakness. This concept of operations requires Soviet forces to strike the enemy in a weak area. It requires speed, surprise, and extensive maneuver to deliver the main blow at a weak point in the enemy's defensive posture or upon his flanks or rear (9:91).

Attacking Strength. This concept of operations is the shortest and quickest way to decisively win a battle. It requires Soviet forces to deliver a fast and overpowering attack directly at the enemy's main strength at the beginning of a military campaign (9:91). Subsequent operations would concentrate on deep exploitation and destroying the remnants of the shattered enemy force.

Types of Offensive Operations. Soviet military doctrine recognizes three different offensive operations: an attack of a defending enemy, a meeting engagement, and a pursuit of a withdrawing or retreating enemy force (9:94). An attack involves the coordinated combination of fire and maneuver to destroy the enemy force. This term usually refers to tactical operations against an occupied enemy position or installation (9:98). A meeting engagement occurs when both enemy and friendly forces are conducting offensive operations and meet while moving. Soviet military theory holds that the meeting engagement is the most likely form of combat under conditions overshadowed by the potential or actual use of weapons of mass destruction (9:98). A meeting engagement will be characterized by confusion and a rapidly changing situation with relatively short but intense battles as both sides swiftly build up forces in contact to gain and maintain the initiative (9:98). A pursuit is an offensive military operation designed to attack a retreating or withdrawing enemy force so as to complete its destruction. Soviet military

writings recognize two types of pursuits: parallel and frontal (9:98). A parallel pursuit involves a high speed movement along the flanks and the rear of the enemy force so as to surround him. A frontal pursuit involves continuous attacks on the enemy's flanks and rear so as to force him to turnaround and fight under unfavorable circumstances (9:98).

Organization of Forces for the Offense. The Soviets have developed an organizational format for the offense based on a concept of attacks in successive waves. This format allows them to maintain constant pressure on the enemy while retaining a high degree of mobility and operational flexibility (37:66). During the conduct of the offense, it is standard practice for Soviet forces to use one, two, or three echelons to provide depth and flexibility to their attacking formations (9:94; 37:66). The Soviets would possibly use a single echelon on a wide front in order to place maximum combat power forward when opposing a relatively weak or disorganized enemy or when operational or strategic surprise can be assumed (9:94; 37:66). The preferred offensive formation is composed of two echelons because it affords heavy combat power forward and depth to the attack (9:94; 37:66). This method of organization is used particularly against well prepared defenses. The least desired formation is the use of three echelons, and it is used only when maneuver space is constricted or when speed of movement is paramount (9:94).

During the conduct of the offense, the forces in the successive waves will be assigned tactical missions as either second echelons, reserves or Operational Maneuver Groups (OMG's). A second echelon usually consists of approximately 30-40% of the total force available (37:66); and in the Soviet perspective they are considered to be committed forces, even if they are not in contact with the enemy (9:94). Second echelon forces are often assigned the same mission as the first but are assigned the task of exploiting the success of the first echelon, or of maintaining the momentum of the attack by replacing or reinforcing the first echelon (9:94).

When information pertaining to the enemy's defense is insufficient to permit prior planning or when the situation is fluid, the Soviets will form a small reserve force instead of a second echelon. The reserve usually consists of approximately 30-35% of the total manpower (37:66) and is considered an uncommitted force which is used to handle unexpected contingencies (9:94). The reserves could be used to repel counterattacks, cover flanks, create the external front of an encirclement, widen a breakthrough, or replace exhausted first echelon forces (37:66).

Soviet military doctrine has recently developed an alternative to the multiple echelon assault; the Operational Maneuver Group (OMG) (37:66). The deployment of formations as OMG's is an attempt to get major combat forces deep into the operational depths of the enemy's

defense during attacks. The OMG can best be described as a large raiding force designed to operate independently in the enemy's rear area (4:16). At the operational level the OMG could be made up of one tank division or a motorized rifle division (37:66; 4:16). The targets of these exploitation forces will be nuclear weapons systems, command and control facilities, air defense weapons, airfields, reserves, reinforcements and logistic centers (37:66). It is possible that once the OMG penetrates the enemy's defenses they may divide into battalion size forces and strike several targets simultaneously (37:66). These forces must move at high speeds to make nuclear targeting difficult (37:66) and they must strike at the enemy's strategic depth seizing major economic, political or military targets to bring hostilities to an early conclusion (4:20).

Elements of Offensive Battle. Soviet commanders are taught that the conduct of the offense requires the application of two elements of battle; maneuver and shock.

Maneuver. In Soviet military theory, maneuver refers to organized movement in combat designed to concentrate forces and means necessary to strike a decisive blow on the enemy (9:106). It may involve the maneuver of troops such as tank and motorized rifle troops or the maneuver of fire such as artillery, rocket troops, armed helicopters, and ground attack aircraft (9:106). Soviet military theory recognizes three basic forms of maneuver:

the breakthrough, the envelopment and the turning movement.

A breakthrough maneuver is the massing of troops and fires to create an open flank in a strong, well-organized enemy defense (9:107). Current Soviet military theory holds that the conditions requiring a breakthrough operation at the operational or strategic level are unlikely to exist due to the use or threat of use of nuclear weapons (9:107; 35:12). The potential use of nuclear weapons will cause an enemy to disperse his forces and not form a solid defensive front in depth (9:107). Additionally, the massing of troops required to conduct a breakthrough operation offers the enemy a lucrative target for nuclear weapons (35:12). Soviet military theory recognizes that a tactical mission or situation may require an attack on a fortified region where they must penetrate the enemy's defense to rapidly destroy him. In this case, Soviet commanders are taught to use weapons of mass destruction or heavy concentrations of conventional munitions to create a gap in the defenses and to rapidly exploit it with highly mobile tank or mechanized forces (9:107-108).

In Soviet military theory, an envelopment is an offensive operation directed against the flanks and rear of the enemy force in an attempt to destroy the force rather than by-pass it (9:108-109). In this type of operation the maneuvering force moves in a relatively shallow and constricted envelope around the enemy force while remaining

in range of direct support and under continuous control of the parent unit (9:108-109). According to current Soviet military writings, there are several problems associated with the execution of massive envelopments. These operations are very expensive in terms of the number of troops required (35:15). Consequently, they take forces away from penetrating deeply into enemy territory. The time required to properly execute these operations also slow down the Soviet forces' rate of advance (35:15).

In Soviet military theory a turning movement requires maneuvering forces to move in a wide and deep envelope around the enemy force so as to attack his rear (9:109). The basic aim of the turning movement is to threaten the enemy's lines of communication (LOC) and force him to abandon both his defensive position and the area that he occupied prior to the start of the maneuver (2:20). The maneuvering force uses such a wide and deep movement that it cannot be directly supported by the parent unit (9:109; 2:20). Once the maneuvering force is in place to the enemy's rear, they will establish blocking forces to deny the most likely routes of withdrawal to the trapped enemy (35:16). As the enemy force attempts to withdraw, it will suffer casualties and will be fragmented via the use of multiple escape routes. The Soviets feel that the turning movement destroys the cohesiveness and effectiveness of enemy formations with the least cost in their own troops and time (35:16).

Shock. Soviet military theory defines shock as the physical and psychological effect of violence and surprise on the enemy's capability to fight (9:111). Soviet commanders are taught that they can achieve shock three ways: nuclear shock caused by use of atomic weapons, fire shock caused by conventional munitions delivered by ground weapons or aircraft, and troop shock caused by tank and motorized rifle troops (9:111). The purpose of shock action is to break apart enemy units so that attacking forces can achieve deeper objectives and leave the isolated and disorganized enemy groups for later defeat in detail (9:111).

Conduct of the Offense

Soviet military doctrine stresses that the offensive will be launched on a broad front to increase the shock effect to the enemy (35:13). This offensive effort would also act to conceal the main axis of advance of the Soviet forces. Multiple threats posed to the enemy would complicate his deployment of reserves and his overall conduct of the battle (35:13). This concept of operations is critically dependent upon surprise so as to prevent the enemy from strengthening his defensive posture (35:17). In Soviet military terminology "surprise" in offensive operations means more than the "unexpected." It implies the concept of "stunning or paralyzing the enemy" through violence and the speed of the attack (9:113). The Soviet

conduct of the offense also includes the use of the maximum quantity of supporting fires in the shortest possible time without any delay between the shifting of supporting fires and maneuver forces closing on the objective (9:114).

The main goal of the offensive is to achieve destruction of the enemy throughout the entire depth of the battlefield. The conduct of the offense will require deep attacks on the enemy's combat, combat support (CS), and combat service support (CSS) capabilities in order to take away his initiative and freedom of maneuver (9:115). The deep attack will be carried out by second echelon or OMG forces that will exploit penetrations in the enemy's defensive posture. Additionally, deep attacks will be conducted by conventional artillery and air-delivered munitions in order to support the penetrations and to disrupt the enemy's rear areas (9:115). Soviet military doctrine and military theory stress the extensive use of landing operations to support operational and tactical plans (9:114). In coastal areas, this will include amphibious assaults by the Soviet Naval Infantry and in other areas it includes the extensive use of airborne and air assault troops (9:114). To destroy the enemy's national "will to fight" the Soviets will employ psychological operations against the enemy and the population (9:115). These operations will be carried out primarily by Spetsnaz forces and organized partisan groups in the enemy's rear area. The significance of Soviet rear

area operations was illustrated in 1975 by the Soviet operation OKEAN, a total military service exercise (80:26). Part of the exercise included an opposing force phase in which the rear area of the "enemy force" was interdicted in over 1,000 places in a very short period of time (80:26).

An interesting characteristic of Soviet forces conducting the offense is that they have developed standard operating procedures (SOPs) within all Soviet combat and combat support units to reorganize when heavy combat losses occur (9:116). Soviet commanders are not taught to expect replacements for human casualties and equipment losses. Instead, Soviet commanders are taught that battalions will have to organize into companies and companies will have to organize into platoons as the battle progresses (9:116).

Landing Operations

Soviet military terminology defines a landing as any military operation which uses specially trained or dedicated forces to conduct military operations on enemy controlled territory (9:156-157). This term does not make distinctions by the scale of an operation or the delivery means of the forces involved, but it specifically refers to operations against enemy controlled territory. Since the opposing forces are battling for territorial control of the front lines or the battle area, the term "landing operations" seems to imply the delivery of combat forces

into the enemy rear in order to conduct military operations (9:157).

The Soviets categorize landing operations based upon the level of command by which they are executed: strategic, operational or tactical (9:157). Landing operations which are conducted against the enemy's homeland with the basic objective of forcing him out of the war or those conducted in other vital regions to open a new front are called strategic. These landings may involve inserting forces with air landings, sea landings or a combination of both (9:157). Landing operations designed to influence the battle at the operational level are categorized as operational landings. These are usually planned and executed by front or army commanders using organic assets (naval infantry or airborne forces) against enemy nuclear weapons (storage and delivery means), command and control facilities, and critical areas such as sea ports or communication centers to deny their use to the enemy (9:157). Tactical landing operations are used to seize objectives in the enemy rear of immediate importance to a tactical commander (division or below). These operations employ platoon to regiment size forces of naval infantry, ground forces, or airborne forces delivered by ship, parachute or helicopter. Link-up operations with the main force usually occur within several hours (for heliborne forces) or several days (for airborne and naval infantry forces) (9:157). Historical precedent, the force structure

of landing units and Soviet military writings all strongly confirm that the predominate form and role for Soviet landing operations is at the tactical level (9:158).

Naval Infantry. During World War II Soviet amphibious operations were generally used at the tactical level in support of the army. These operations were used to reinforce or evacuate troops, to cross rivers or straits, and to seize critical areas just behind enemy lines in coordination with larger thrusts along the main axis (52:51). Current training of Soviet Naval Infantry (SNI) forces (9:158) and recent tactical exercises (1981 to 1984) (52:56-57) strongly indicate that these forces are still intended to provide primarily tactical level capabilities for Soviet ground forces operating in the vicinity of coastlines (9:158).

The current total manpower for the Soviet Naval Infantry is approximately 16,000 troops (52:52). This total force is distributed among four operational fleets; the Pacific, the Northern, the Baltic, and the Black Sea fleets (9:158). The Pacific Ocean fleet has a single SNI division, with approximately 7,000 troops and is made up of three naval infantry regiments, a tank regiment, and supporting units (52:55). The other three Soviet fleets each have a brigade of approximately 3,000 troops with each brigade consisting of four naval infantry battalions (about 400 to 600 men each) and a tank battalion (52:55).

The force structure of each brigade allows it to capture and hold territory of up to 10 to 12 kilometers wide and 15 to 20 kilometers deep (52:52). Some SNI forces have received airborne training and some are now training with helicopters (52:56). During recent tactical exercises the SNI forces have displayed the joint use of helicopters and paratroops in conjunction with conventional amphibious landings (52:58).

Airborne Operations. The Soviets maintain an airborne force of eight divisions supported by a fleet of 1700 transport aircraft (9:158; 83:56). Each division has approximately 6,500 troops and 330 BMD vehicles (51:27). An airborne division is made up of three airborne regiments (1,455 men each) and division support elements which include an artillery regiment, an assault gun battalion, an antiaircraft battalion, an engineer battalion, a signal battalion, a parachute rigging and resupply battalion, a transport and maintenance battalion, a medical battalion, a reconnaissance company and a chemical defense company (31:4-139). An airborne regiment consist of three airborne battalions (each with 310 men) and regiment support elements which include a mortar battery, an antitank guided missile (ATGM) battery, an antiaircraft battery, an engineer company, a signal company, a parachute rigging and resupply company, a transport and maintenance company, a chemical defense platoon, a medical platoon, and a supply and service platoon (31:4-136). An airborne battalion

consists of three airborne companies (each with 85 men), a communications platoon, a supply and service platoon, a repair workshop and a medical aid station (31:4-135). An airborne company consists of three BMD platoons (each with 23 men), an antiaircraft missile squad, and a weapons squad (31:4-134).

Each airborne company is highly mobile with its eleven organic air droppable light armored fighting vehicles; the BMD-1 (18:11). The BMD-1 has a 73-mm smoothbore gun, a 7.62-mm coaxial machine gun mounted on the right side of the main gun and a sagger antitank guided missile (ATGM) launcher mounted over the main gun (31:5-25). Soviet military writings emphasize the vulnerability of airborne landings to rapid enemy counterattack, particularly by aircraft and armor (15:34). Consequently, all airborne units are assigned numerous antitank and antiaircraft weapons (30:2-3). Additionally, each airborne company is armed with assault rifles, light machine guns, and automatic grenade launchers (18:11). Although smaller in size the total combat power and mobility of an airborne company closely approximates that of a motorized rifle company (9:159). Another piece of unique equipment used by the Soviet airborne soldier is his parachute. After the static line opens the rear of the pack the airborne soldier must pull an additional "rip-cord" handle to get the parachute to deploy (15:30). This capability allows the airborne forces some flexibility in choosing the altitude

at which they desire their parachute to open. If the landing zone is under fire then they can delay the opening of their chutes to reduce their exposure to hostile fire (15:30).

Current Soviet military training of airborne units indicates that company through regiment size forces will conduct tactical or operational level operations in direct support of ground forces (9:158). Recent training exercises suggest that airborne units will be used to quickly neutralize or seize enemy command and control facilities, airfields and nuclear weapons storage or delivery sites (15:32; 51:29). Since they have a mechanized capability, the landing zones may be as far as 10-20 kilometers from their objective (9:101). Soviet airborne forces generally perform jumps under the cover of darkness (15:33) from an altitude of 150 to 300 meters, and the landing zone is usually secured by a small reconnaissance and security element which precedes the main force by approximately 15 minutes (9:159). First, heavy equipment and crew served weapons are dropped into the landing zone. Personnel follow close behind (9:159). The vehicles are equipped with small radio homing beacons to assist the troops in locating them during night operations (9:159). Airborne troops are taught to rapidly assemble and organize in the drop zone and to depart enroute towards their assigned objectives as quickly as possible (51:29). Soviet military writings stress the need for a rapid link

up with ground forces and hold that airborne forces should not have to fight more than three days on their own before a link up is made (51:30).

Air Assault and Airmobile Forces. The Soviets have formed eight air assault brigades to support fronts (11:99). These brigades each have approximately 2,000 to 2,600 troops and consist of two BMD equipped airborne assault battalions, two (non-mechanized) parachute infantry battalions and associated combat and service support elements. They are structured similarly to the airborne divisions, except they are smaller in size (11:99). The Soviets have also established three or four airmobile brigades which each have approximately 1,700 to 1,850 troops and an independent, 500 man air assault battalion to support selected armies (11:99). These forces are designed to conduct tactical and operational operations in support of the front or army commander's overall scheme of action. These helicopter assault troops are lightly armed and lack ground mobility (with the exception of the BMD equipped battalions); and their objectives are usually undefended, or lightly defended, terrain in the enemy rear within 20 kilometers of the line of contact (9:159). Armed helicopters and long range artillery usually provides fire support for these forces and a link-up with the advancing main force usually takes place within a matter of hours (9:159).

The missions performed by these air assault brigades are designed to contribute to the overall success of the Soviet ground forces. Since 1976, heavily armed combat helicopters have been observed in every major Soviet military exercise (40:6). In current field exercises, tactical troop transports and insertions by helicopters have also been used extensively (52:56-57). Current Soviet military writings stress the following tactical and operational missions for air assault and airmobile forces:

1. Destroy enemy command, control, and communication facilities and rear area logistics centers (40:5).
2. Seize critical high-tempo terrain objectives such as bridges, crossing sites, road junctions, mountain passes, and airfields to assist the forward advance of main forces (39:41).
3. Seize and control terrain in the enemy's rear area in order to delay or destroy his reserve forces (40:5).
4. Conduct deception operations such as feints, demonstrations, and ruses (40:5).
5. Conduct pursuit operations of withdrawing enemy forces (40:5).
6. Conduct operational penetrations along coastlines or bridgeheads to assist the landing of amphibious forces (40:5).

The Soviets feel that simplicity is the primary advantage of heliborne operations. Soldiers conducting these operations need only minimal training and support (40:8). During large-scale Soviet field training exercises air assault and airmobile units have demonstrated the ability to seize critical terrain, destroy high value targets, and support high tempo deep offensive penetrations (39:45).

Spetsnaz. The Soviets maintain the largest body of special forces in the world (53:30); and these diversionary or diversant forces are normally referred to by their Russian acronym, Spetsnaz (9:159). It is estimated that during peacetime the strength of these forces is between 27,000 and 30,000 troops (81:1211). This number does not include personnel serving in training or support units nor officers involved in recruiting and running agents outside of the USSR. Spetsnaz forces are controlled by the Soviet Military Intelligence, the GRU (53:30; 81:1209). This organization is not subordinate to, nor does it have any connection to the KGB (81:1210). The GRU is responsible for reconnaissance, agent derived intelligence, Spetsnaz training and operations, processing and dissemination of information pertaining to the enemy, and radio intercept or signals intelligence (81:1210). Spetsnaz forces are deployed from army level upwards, and the total Spetsnaz network consists of three primary elements: carefully selected and trained soldiers forming combat units; top-

grade professional athletes; and foreign agents (81:1212-1213). These special forces may be infiltrated by helicopter, parachute, sea, or other means in company or smaller size units (9:159).

Missions. These special forces have a wide variety of demanding and sensitive missions. During peacetime, they conduct training and reconnaissance activities designed to meet wartime intelligence needs (53:30). During wartime, Spetsnaz forces would operate far behind enemy lines and conduct reconnaissance, sabotage, and coordinated attacks on diverse military, political, and economic targets (53:30-31). The targets for these diversant units would include nuclear weapons delivery and storage sites; command, control, and communications facilities; headquarters of key military units; airfields, sea ports, and air defense installations; and lines of communications (53:36; 81:1210). Additionally, these units are tasked to hunt down and assassinate key political and military leaders and cause disruptions in the enemy's power system by attacking power stations, oil and gas storage centers, pipelines, electricity power lines, and transformer stations (81:1210). These targets and missions are not only designed to destroy the enemy's capability to fight but also to destroy the national will to fight by spreading chaos, panic and confusion among rear area troops and the local populace (9:159; 53:31). These wartime

missions would complement the overall combined-arms offensive and would begin at the very outset of hostilities (53:31).

Training. The training of these special forces is made as realistic as possible through the use of accurate full scale models of enemy installations and weapons such as mockup airfields, nuclear storage sites and communications facilities (53:30; 81:1213). In general these forces are trained in the following skills: infiltration techniques; sabotage methods using explosives, incendiaries, acids, and abrasives; airborne operations; clandestine communications; hand-to-hand combat and silent killing techniques; psychological operations; languages and customs of target country; survival behind enemy lines; and reconnaissance (53:36; 81:1213).

Equipment. The equipment used by Spetsnaz forces includes: assault rifles such as the AKS-74 and the AKR (both 5.45mm with folding stocks), the SVD 7.62mm sniper rifle, the P6 and PRI pistols, grenades, knives, portable missiles such as the SA-7 surface to air missile (SAM) and possibly the AT-3 and AT-4 antitank guided missiles (ATGM's), burst transmission radios, maps, explosives, rations, medical kit, and equipment to permit independent operations for several days (53:36).

Combat Units. Each army is supported by an independent Spetsnaz company and each front is supported by a Spetsnaz brigade plus a Spetsnaz intelligence center,

which recruits its own clandestine foreign agents (53:30; 81:1210). Additionally, the headquarters of each Soviet fleet has a brigade of Spetsnaz forces (81:1210).

The Spetsnaz company has a strength of approximately 115 troops and consists of a headquarters element, three parachute platoons, a communications platoon and various support sub-units (81:1210). The company may operate as a single unit or be divided up into smaller groups of 5 to 12 men (53:30; 81:1210). The communications platoon has the capability of establishing and maintaining communications with all groups operating within a range of 1,000 kilometers (81:1210). The Spetsnaz company will normally support the army commander's scheme of actions within a range of 100 to 500 kilometers in the enemy's rear area (81:1215).

A Spetsnaz brigade has a strength of approximately 1,000 to 1,300 troops and consists of a headquarters company, three or four parachute battalions and various supporting units (81:1210). The Spetsnaz naval brigade consists of a headquarters company, a group of midget submarines, two or three battalions of combat swimmers, one parachute battalion and various supporting units (81:1210-1211). Depending upon the specific mission, the brigades are trained to operate as a single unit or as smaller teams (81:1210). They support the operational plans of the front commander by operating in the enemy's rear area to a depth of 500 to 1,000 kilometers (53:31; 81:15). The Soviet

Spetsnaz naval brigades will operate against enemy naval installations with priority being placed on submarine bases (81:1215).

The Spetsnaz combat units are primarily deployed by parachute (81:1211) and receive training similar to that of the airborne forces (81:1213). These troops normally wear the uniform of the airborne forces unless they are stationed in close proximity to other types of troops, and in order to disguise their presence they will adopt the uniforms of the latter (81:1211). The Spetsnaz combat forces do not have any organic heavy weapons; however, when operating in the enemy rear they may seize enemy tanks, armored personnel carriers (APCs) or other vehicles to use in the accomplishment of their assigned missions. They may even wear the uniform of the enemy (81:1215).

Professional Athletes. The professional athletes are formed into Spetsnaz regiments with a manpower strength of approximately 700 to 800 personnel and consisting of six or seven sabotage companies (81:1211). These regiments are different from Spetsnaz companies and brigades because they are manned solely by professional athletes of the highest caliber which includes many Olympic level athletes (81:1211). These forces are organized as sporting teams belonging to the Central Army Sporting Club (ZSKA) and the fact that these athletes have military rank is not hidden (81:1212). These forces are trained in small groups and receive primarily physical training (often to Olympic

level) in their respective sport (81:1213). They are also trained in foreign languages, communications and various demolition methods. They also study the territories that they are likely to operate in during wartime, and this is reinforced by traveling to those countries in support of sporting events (81:1213). These regiments will operate in the enemy's homeland (81:1215).

Foreign Agents. To the Soviet's, the word "agent" only refers to a foreigner recruited by the Soviet Union's intelligence services (81:1213). The Spetsnaz organizes the use of agents into two teams; intelligence and sabotage. The intelligence teams do not conduct any overt operations but use GRU supplied money to buy or rent houses in close proximity to important targets (airfields, bridges, nuclear weapons storage and delivery means, naval bases, etc.) (81:1213). Through day to day surveillance these units provide intelligence information that will be used by Spetsnaz sabotage or combat units to deliver sudden and accurate strikes (81:1213). The Spetsnaz sabotage agents are not concerned with intelligence collection and they are usually instructed to find jobs or live close to transport and power installations (81:1213). When ordered by the GRU, they plant explosive charges to destroy or cripple their assigned installation (81:1213). During peacetime the Spetsnaz sabotage agents are responsible for obtaining houses and plots of land where sabotage groups and partisans can find refuge during time of war

(81:1213). These agents are trained on an individual basis in special training centers located mainly on Soviet territory; and they are instructed in subjects such as security, communications, demolitions, and working with professional (intelligence) groups (81:1213). The organization of these two agent units actually forms a "sleeping" agent network which can be brought into action in the event of war (81:1213).

The Soviets believe that Spetsnaz operations can be effective only if they take place simultaneously and on a massive scale in conjunction with rear area operations by airborne, naval infantry, and air assault forces (81:1215).

IV. US AirLand Battle Doctrine

An army's doctrine describes the approach it will take to fight and support campaigns, major operations, battles, and engagements (28:6; 75:5). Military doctrine is a conglomeration of historically tested theories and principles pertaining to warfare. Doctrine should be specific enough to be used as a guideline for military operations and flexible enough to cover unexpected situations (28:6). An army's doctrine will guide the tactics, operational procedures, force and support structures, equipment, and training that are used and developed by that force (28:6; 49:33).

The current fighting doctrine of the US Army is called AirLand Battle (28:9). This doctrine strongly emphasizes the offensive (49:35) and derives its name from the recognition of the three dimensional nature of modern war: the width and depth of land battles in conjunction with the use of airspace (28:9). The basic objective of the doctrine is for US forces to seize and maintain the initiative and achieve their mission by imposing their will upon the enemy (28:14). To do this, US forces must be capable of striking the enemy with a quick and powerful blow, follow up rapidly to prevent his recovery, and aggressively continue the operations until the higher commander's objectives or goals are achieved (28:14). The

doctrine clearly recognizes the role of airpower as a vital necessity in the successful achievements of friendly ground combat forces (28:9).

AirLand Battle doctrine assumes an intense interaction between two active and intelligent military forces (49:33). The doctrine introduces the concept of actively winning a future conflict and is a departure from the defensive doctrine of the 1970's which emphasized the concepts of attrition and annihilation (49:38; 75:8; 6:45). The concept of "winning" in the AirLand Battle doctrine refers to decisively defeating the enemy on the field of battle and destroying his will or capability to wage war (75:8). The doctrine stresses initiative, momentum in the attack, flexibility, violent execution, surprise, and shock effect: all vital characteristics of an offensive spirit (75:6). It advocates the use of these prescribed characteristics in striking the enemy's vulnerabilities when least expected (49:38). The doctrine envisions a synchronized order of battle among friendly combined arms to not only destroy the enemy forces within the main battle area but also the use of decisive, coordinated, deep attacks to prevent him from concentrating his firepower or maneuvering his forces (6:45). Through the enlargement of the battlefield area, the AirLand Battle doctrine reinforces the idea that future conflicts will be fought on a nonlinear battlefield (49:41; 55:4).

Historical Development

There were a number of political, technological and military factors that influenced the development of the AirLand Battle doctrine. During the 1970's public sentiment during and after the Vietnam war influenced American politics (76:52). At the same time the Soviets embarked on a massive arms and force build up and due to "neoisolationist" sentiments in congress there was delayed US political response to the Soviet's worldwide power moves (76:52). Political advisors were divided about the prosecution of US foreign policy, although our defense commitment to NATO remained firm (76:52). Part of this congressional attitude plus the Vietnam wind down resulted in reduced defense budgets (76:52). These political trends resulted in two operating parameters for the Department of Defense: a decade of severely constrained weapons budgets and an almost exclusive focus on Europe and the NATO commitment (76:53).

The technological revolution of the mid 1970's had an impact on the development of the AirLand Battle doctrine. There were significant advances in the computer chip which allowed tremendous improvements in weapons systems designed for target surveillance; target acquisition; precision guidance for munitions; and command, control, communication, and intelligence equipment (55:3). Additionally, conventional munitions were developed which had a destructive equivalency of low-yield nuclear weapons

(55:3). These developments afforded the tactical commander added non-nuclear firepower (55:3). Post-Vietnam research and development programs were producing major new hardware systems such as the M1 Abrams Tank, the M2/M3 Bradley fighting vehicle, and the multiple launch rocket system (MLRS) (6:50). The net effect of these developments meant that a ground commander could advance boldly even though he might be outnumbered. The Army needed a tactical concept that could unify these systems (6:50).

Military factors had a significant impact on the development of the AirLand Battle doctrine. The most important influence was the Arab-Israeli War of 1973 (76:53). During clashes of massed armor, which had not been seen in approximately 30 years, the Israeli and Arab armies sustained 50 percent material losses in less than two weeks of intensive combat (76:53). The lessons learned from this conflict emphasized to US Army doctrinal analysts that the tempo of modern combat created a highly lethal and destructive environment (76:53). This new combat environment would require a new tactical doctrine which would take advantage of perceived Soviet weaknesses (50:13). These weaknesses were viewed as the inflexibility of Soviet command and control and the rigid employment of echelon forces (50:13).

Between 1977 and 1980 joint efforts between the US Army's Training and Doctrine Command (TRADOC) and the Combined Arms Center (CAC) resulted in several new tactical

concepts (76:53). Among the most prominent of these concepts were the central battle, early interdiction and disruption of the enemy's second echelon forces, an integrated conventional-chemical-nuclear tactical approach, and the concept of extending the battlefield into the enemy's rear area (76:53). After refinement of some of these new tactical concepts the AirLand Battle doctrine was published in 1982 (76:55; 45:47). The new doctrine restored the maneuver-firepower balance, introduced moral factors and the human dimension of combat, clarified the notion of the operational level of war, and revitalized the fundamental principle of attaining victory (76:55). The doctrine was again revised and published in 1986 and it reemphasized the central aspects of the AirLand Battle doctrine - the recognition of the importance of the operational level of war, the focus upon the seizure and retention of the initiative, and the requirement for multi-service cooperation (28:ii). Additionally, the 1986 revision recognized a single nonlinear battlefield composed of three integrated and mutually supporting operational areas (28:2-3; 49:42).

Principles of War

To fully understand a doctrine it is imperative to know the basic foundation of that doctrine (49:35). The AirLand Battle doctrine has its foundation in the nine US accepted principles of war: objective, offensive, mass,

economy of force, maneuver, unity of command, security, surprise, and simplicity (28:22). These principles have evolved from time tested theories and historical analysis of numerous wars and battles. They contain the basic requirements for successful military operations.

Objective. The principle of objective requires each military operation to pursue a clearly defined, decisive, and attainable objective (23:14). The ultimate aim of the war is to achieve specific political objectives; and each level of military objectives should contribute, directly or indirectly, to the attainment of these (23:14).

Offensive. The principle of the offensive requires forces to seize, retain, and exploit the initiative (23:14). This principle holds that offensive action is the most effective way to achieve military objectives.

Mass. The principle of mass requires forces to concentrate combat power at the decisive place and time (23:14-15). This principle suggests that fire superiority is established by concentrating the proper type and amounts of firepower at the objective in a coordinated effort.

Economy of Force. The principle of economy of force requires military forces to allocate minimum essential combat power to military efforts (23:15). Commanders need to consider the total area of operations when committing forces to action. When a commander commits more forces to an objective than necessary he may be leaving himself vulnerable in other areas.

Maneuver. The principle of maneuver requires forces to place the enemy in a position of disadvantage through the flexible application of combat power (23:15-16). This principle requires the extensive use of fire and movement to place the enemy in a position of disadvantage (23:16).

Unity of Command. The principle of unity of command requires that each military operation have only one responsible commander who directs and coordinates the combat power of all forces involved (23:16).

Security. The principle of security requires forces to never let the enemy acquire an unexpected advantage (23:16-17). This includes the measures that units take to protect themselves from enemy surprise, observation, detection, interference, espionage, or sabotage.

Surprise. The principle of surprise requires forces to strike the enemy at a place and time and in a manner for which he is unprepared (23:17). The use of surprise effects the outcome of the battle by placing the enemy in an awkward position from which he may not be able to effectively react.

Simplicity. The principle of simplicity requires forces to prepare clear and uncomplicated plans and for commanders to issue clear and concise orders so as to insure a thorough understanding of the assigned tasks and objectives (23:17). The use of simple and direct plans eliminates the possibility of confusion and misunderstanding.

Tenets of AirLand Battle

AirLand Battle doctrine has four basic tenets that characterizes successful operations on the battlefield; initiative, agility, depth, and synchronization (28:15, 22-23).

Initiative. Initiative refers to the action that sets or changes the battle. In the AirLand Battle doctrine this tenet implies that our forces need to demonstrate an offensive spirit in all operations (28:15). During defensive operations the defenders must act rapidly to respond to the attackers' initial actions in order to gain control of and shape the battle (28:15). The aggressiveness of the enemy's attack has to be eliminated by the defending forces to reduce the enemy's freedom of movement. During offensive operations the attacking forces need to maintain the momentum of the attack and never allow the enemy to recover from the initial shock (28:15). The attacking commander must create a fluid situation, responding quickly to movements of enemy forces that are attempting to jeopardize his freedom of movement.

Agility. Agility refers to the ability of our forces to act faster and to be more flexible than the enemy (28:16). This ability is the prerequisite for seizing and maintaining the initiative and requires the capability to quickly concentrate forces against the vulnerabilities of the enemy (28:16).

Depth. Depth refers to the expansion of operations in terms of time, space, and resources (28:16-17). Commanders need to concentrate their efforts by attacking the enemy's flanks, rear and support echelons to degrade the enemy's freedom of movement (28:17). Commanders need to maintain reserve forces and a flexible main effort so they can immediately respond to detected weaknesses in the enemy's positions and push the attack into the enemy's rear area (28:17). To maintain their own freedom of movement commanders must be concerned with the security and protection of rear and support areas.

Synchronization. Synchronization refers to the arrangement of battlefield activities with respect to time, space, and purpose so as to generate maximum combat power at the right place at the decisive time (28:17-18). This requires close coordination of all forces involved in the operation.

Areas of Operations

The AirLand Battle doctrine divides the battlefield into three operational areas; Close, Deep and Rear Operations (28:19).

Close Operations. Close operations involve the activities of committed combat forces that are engaged in the fighting of the current battle (28:36-37). The principle elements are the tactical combat forces that are

involved in fire and maneuver operations against enemy forces (29:37).

Deep Operations. Deep operations involve activities that are directed at the enemy's rear areas. These attacks attempt to shape future conditions of close operations to be more favorable to friendly forces (28:37-39). These operations create a situation where the enemy commander is forced to deviate from his plan and is faced with rapid situational changes (50:16). These activities involve delaying and disrupting enemy reserve forces, destroying the enemy's support and supply systems, and crippling his command and control systems.

Rear Operations. Rear operations contribute to the success of close operations by providing friendly force commanders the necessary freedom of action and by supporting the combat units with required supplies and services (28:39-40; 29:2-11). Some of the activities and units encompassed in the rear area include routes needed for resupply and deployment of reserves, reserve forces, air bases, fire support units, nuclear and chemical storage facilities and delivery vehicles, command and control facilities, communications networks, logistics centers, combat support (CS) units and combat service support (CSS) units (29:40; 27:1-2). Threat doctrine transforms the rear area into a viable battlefield as the enemy attempts to reduce friendly force freedom of movement and capability to continue to fight.

Levels of Threat. The possible threats to units located in the rear area have been broken down into three threat levels to serve as a planning guideline when structuring rear operations (29:1-3).

Level I. Threat level I is considered a peacetime threat that increases in frequency prior to the initiation of open hostilities (19:7). This level is characterized by intelligence collection, sabotage, subversion, and attacks to disrupt lines of communication and delay military preparations (29:1-3). These activities are carried out by enemy controlled agents, sympathizers, partisans, and terrorist organizations (19:7).

Level II. Threat level II activities include diversionary and sabotage operations conducted by special operation forces (SOF); raids, ambushes and reconnaissance operations conducted by combat units; and special missions or unconventional warfare missions (29:1-2). These forces can be airdropped, airlanded or they can infiltrate by land or sea. They usually operate in small forces of 5 to 14 personnel (29:1-4). However, these forces could be dropped in company or larger size units in order to destroy key rear area targets such as air bases, nuclear weapons storage and delivery means, command and control facilities, and logistics installations (29:1-4).

Level III. Threat level III is characterized by major offensive operations by conventional airborne, airmobile, airlanded, or amphibious forces and

deliberate operations by ground forces such as the Soviet's Operational Maneuver Groups (OMGs) (29:1-3). These forces can range in size from battalions to divisions (3-1-4).

Size and Location of Rear Area. The rear area begins at the rear of the main battle area corresponding to the division's rear area and extends through the corps rear area and the communication zone (COMMZ) (4:29). The specific size of this area will greatly depend upon such factors as the terrain, the enemy situation, forces available, etc. Generally, for armored and mechanized divisions, the division rear boundary will normally extend 50-65 kilometers behind the forward edge of the battle area (FEBA), and the brigade rear area typically extends 15-20 kilometers behind the FEBA (18:10). A corps rear area is much larger. For example, the rear area for V Corps (a three division corps) deployed in the Central Army Group (CENTAG) region of NATO is approximately 130 kilometers wide by 120 kilometers deep: a total area of approximately 15,600 square kilometers (17:10).

At full strength a US corps may have over 30,000 combat support (CS) and combat service support (CSS) troops in its rear area (17:14). With proper command and control, communications, tactics, and weapons this could be a highly effective fighting force against sizeable enemy units while maintaining logistics support (17:14).

Concept of Operation. The tenets of AirLand Battle (Initiative, Depth, Agility, and Synchronization) also

apply to battle in the rear area (29:2-2). Initiative implies a spirit of the offense (73:42). Units will have to use speed, flexibility, mobility, and surprise to aggressively seize the initiative from enemy forces operating in the rear area (29:2-2; 73:42). Depth refers to proper utilization of time, distance, and resources (73:42). Units will need to distribute support facilities and plan for alternative support so that support can be continued without any interruption (29:2-2). In applying agility units should be prepared to provide and move forces in anticipation of or reaction to hostile acts by enemy forces (29:2-2). Synchronization results from a unity of effort throughout the rear area to defeat threat forces without degrading forward support (73:43). There are four instrumental elements involved in rear area combat operations: the base defense concept, the rear area operations centers (RAOC) and associated staff, the military police response forces, and the tactical combat forces (TCF).

Base Defense Concept. Rear area protection revolves around the concept of base defense or (most preferably) cluster base defense (29:4-1; 18:15). Each unit forms a base and establishes a defensive posture which gives it the capability to defend itself against threat level I forces (29:4-1). A base is a geographically small area with a defined perimeter and established access controls (29:4-2). When permitted by the tactical

situation, several bases will be grouped within close proximity to each other in order to form a cluster base (29:4-3; 18:15). A base cluster covers a larger geographical area with each base responsible for their own defense and providing mutual support for the other bases within the cluster organization (29:4-3). A base cluster will not have a clearly defined perimeter, and it will normally be created around a battalion or larger size unit. This is because of the requirement to operate a Base Cluster Operations Center (BCOC's) 24 hours a day and to perform staff functions related to rear area protection (18:15). Bases should use both active and passive defensive measures such as active patrolling and reconnaissance operations, preparing fighting positions, hardening and dispersal activities, using and reinforcing natural obstacles, cover and concealment, deception, use of sensors and surveillance devices, and the employment of observation and listening posts (29:4-1).

Rear Area Operations Center. All echelons from brigade to corps are required to have a rear area command post to add depth and agility to the command and control of operations in the rear area (29:3-2). The tactical operations center of each rear command post will be the Rear Area Operations Center (RAOC) under the operational control of the Rear Battle Officer (29:3-1). The RAOC is assigned organic Base Defense Liaison Teams (BDLT's) who

are responsible for organizing the defense of the rear area so as to enhance rear area protection at all echelons (29:3-12).

Military Police Response Forces. The Army's Military Police (MPs) are assigned three battlefield missions: battlefield circulation control (BCC), enemy prisoner of war (EPW) operations and rear area combat operations (RACO) (26:3-1; 67:2). The BCC mission requires the MPs to accomplish tasks that expedite the forward movement of combat resources and supplies (19:3-2). The activities performed under this mission include main supply route (MSR) reconnaissance, surveillance and enforcement; straggler and refugee control; and information dissemination (19:3-2). The enemy prisoner of war (EPW) mission requires MPs to support tactical commanders by taking control of captured EPWs (19:3-8). The activities performed in this mission include the collection and evacuation of EPWs from as far forward as possible and confinement operations for guarding the EPWs (19:3-8). It is important for the MPs to assume control of the EPWs as far forward as possible in order to free tactical forces to continue with their respective missions. The RACO mission requires the MPs to be the principle combat forces for rear area protection (19:3-5). The activities performed under this mission include area reconnaissance, security of critical facilities and MSR points, intelligence collecting and response forces to assist bases and base clusters. In

the event that a base or a base cluster comes under attack from threat level II forces, which exceeds their organic combat capabilities, the bases are tasked to fix or delay the enemy until MP assets can respond to close with and destroy the enemy force (29:4-2).

Tactical Combat Forces. The base defense forces and the MPs are not equipped or force structured to destroy a threat level III force. Once it is determined that a threat level III force is attacking the rear area, a tactical combat force (TCF) designated by the tactical commander will respond to destroy the enemy force (29:3-20). In this case the base defense forces and the MPs will attempt to fix or delay and disrupt the enemy force until the arrival of the tactical combat forces (TCF). Upon the arrival of the TCF all elements involved in the battle are under the operational control of the TCF commander (29:4-2).

Significant Problems. The concept of operations for rear area protection is an excellent method for adding depth and survivability to the modern battlefield. However, in a pragmatic sense the execution of the rear area's concept of operation has some significant problems. These problems fall in four basic areas: the combat service support (CSS) units, the rear area operations center (RAOC), the military police forces, and the tactical combat force (TCF).

Combat Service Support Units. The CSS units serve as the backbone for the rear area protection by forming an intricate network of strongpoints throughout the rear area. However, these units have some serious problems that affect their execution of this doctrine. CSS units are not adequately trained in tactical operations or individual combat skills; a vital ingredient for success in rear area protection (66:24; 18:16; 46:15). Additionally, with current time constraints the training that CSS units are able to perform is limited to proficiency training in their respective support functions (18:23). A study completed by the US Army Logistics Center (LOGC) found that CSS units are not sufficiently armed to survive rear area combat operations (18:18). The study identified numerous weapons and equipment that the CSS units will need to adequately perform the base defense role. The final problem facing CSS units is that given the tempo and violence of modern combat it is not at all unlikely that well over half of the assigned force will be away from the base performing support missions (46:10). This situation is further complicated by the need for shift rotation to support around the clock operations and the need to maintain a defended perimeter (46:10).

Rear Area Operations Center. Forming the rear area units into a network of defensive groupings (base clusters) requires a strong command and control unit (46:5-6). This mission is assigned to the Rear Battle Officer

and his staff which operates the rear area operations center (RAOC). However, all personnel forming this function are assigned to units in the Army Reserves and National Guard (46:5-6). Although their deployment dates have been moved up on the Time-Phased Force and Deployment List (TPFDL) there will still be a gap between the outbreak of war and their arrival (46:6). Consequently, there will not be any dedicated command and control for rear area protection during the most critical threat period; just prior to and initially after hostilities begin. Once the Rear Battle Officer and his RAOC staff become operational they will be in a "catch up" mode (46:56) which could prove to be devastating given the rapid tempo and fluid character of the modern battlefield. Once the RAOC becomes operational they may find it difficult to form a network of base clusters throughout the rear area because many CSS units will have already moved into and prepared their general defensive positions (46:9). To relocate these units would require a disruption in their operations which the tactical commanders can ill afford.

Military Police Forces. The military police (MP) form the main rear area response and combat force. However, the diversification of their three battlefield missions creates some potentially major problems for the conduct of rear area protection. Battlefield circulation control (BCC), the expediting of combat resources forward, is the primary mission of the military police in combat

(67:2). The AirLand Battle will be one of constant movement with forces arriving at aerial ports moving laterally to link up with their equipment arriving at seaports and then moving forward to their fighting positions (67:2; 73:43). There will also be constant movement by support forces as they maintain the combat forces' capability to fight. This rear area chaos will require large amounts of MP manpower to provide convoy and route security and effective traffic control (67:2; 73:43). These problems will be even more pronounced as tactical commanders push deep into enemy territory thus extending the lines of communications (LOC) and the rear area (73:43). Under this scenario, operating in hostile territory, the threat to the rear area and the LOCs will be even greater and require more MP manpower (54:32). Under this same scenario it is possible that MPs will have to destroy or perform containment operations against by-passed pockets of resistance which are now part of the "rear area threat" (73:43). It is also estimated that the violent and intensive clashes between combat forces will result in a significant number of enemy prisoners of war (EPWs) (67:5). These EPWs will place a tremendous burden on tactical forces and the MPs will need to take control of the prisoners as soon as possible in order to free the combat forces to pursue their missions (67:5).

Because of the combined effects of these problems, it is very likely the capabilities of the MPs will be quickly

exceeded (67:2; 46:7; 54:32). One recent example illustrates this possibility. Operation "Urgent Fury" (Grenada) after action reports indicated that during the initial phase the EPW operations and the security missions frequently exceeded the capabilities of both division and corps MP forces (67:14).

Tactical Combat Force. The use of a tactical combat force (TCF) to destroy level III threat forces generates several possible problems for the conduct of rear operations. Given that the threat will use rear area incursions to support the advance of his main force, it is possible that the tactical commander will be reluctant to commit significant combat power (i.e. a TCF) to respond to these incursions until the overall threat can be clearly defined (18:16). This could have a significant impact on CSS units and MP forces who find themselves grossly outnumbered and/or outgunned. Additionally, once a TCF is committed and arrives at the site of the incursion, command and control of the battle transfers to the tactical commander of the TCF. The base cluster commander is familiar with the terrain and the current deployment of forces involved in the fight and should retain the overall command and control of all forces (46:13). Since the battle will likely be brief and violent, the small degree of confusion or uncertainty during the transfer of command and control could have a significant impact on the outcome of the battle (46:3).

V. Security Police Air Base Ground Defense Operations

The US Air Force (USAF) is tasked with the combat missions of counterair, interdiction, air reconnaissance and tactical air support in addition to providing air transport for Department of Defense (DOD) forces (19:4). Given the analysis of the preceding chapter there is little doubt that US Air Force assets will play a vital role in the successful execution of the AirLand Battle doctrine in any future conflict. USAF airpower is capable of performing missions in the deep attack role and providing close air support for close operations. For any of our adversaries to conduct landing operations in our rear (particularly, large scale assaults) they will need a degree of freedom in our airspace. Therefore, protecting and denying the use of our airspace to our adversaries will be another important role for airpower assets in conjunction with air defense artillery. As was discussed in Chapter III, the threat clearly recognizes the impact of airpower upon his scheme of maneuver. This is indicated by their intensive training to destroy or capture air bases. The attractiveness of our air bases as early targets for threat forces could be enhanced by the important role they play in our initial force buildup within a particular theater of operations and the storage of nuclear weapons. As was pointed out in Chapter III, threat forces strive to

destroy nuclear weapon storage and delivery means as early as possible so as to prevent their use. As a result of all of these factors air bases will become lucrative targets for threat forces.

The Air Force's Security Police (SP) are tasked to provide a defensive posture for air bases during a wartime environment (29:6-4, 7-5). They are specifically tasked to be trained, equipped and employed to defeat threat level II forces (29:6-4). In the event of an attack by level III forces the SPs will conduct delaying actions until the arrival of a tactical combat force (TCF) (20:4). To support this tasking the SPs have developed a system of deployable teams known as Air Base Ground Defense (ABGD) forces. The basic purpose or objective of the ABGD force is to ensure the survivability of the air base. It involves operations which uses military measures to neutralize or reduce the effectiveness of an enemy attack on an air base so that the senior commander has the capability and freedom to generate air sorties or sustain air operations (19:10).

Composition of ABGD Forces

The wartime mission is performed by mobilizing elements or teams from different security police units and bringing them together at the base to be defended (21:5). The teams' organization and equipment are based on specific ground combat needs. They fall into two categories: general purpose units (GPU) and air base ground defense

(ABGD) units (21:5). The general purpose units are made up of active duty and reserve personnel who do not have special experience identifiers (SEI) 327 which are acquired through ABGD and combat training. These forces are used primarily as filler forces or casualty replacements (21:5). The ABGD forces are made up of active duty and reserve personnel who have received additional training in ground combat and are awarded SEI 327 (21:5). The ABGD forces are organized into three categories: Air Base Ground Defense (ABGD) Flights, Heavy Weapons Sections and Air Base Ground Defense Squadron Headquarters (19:13-16). The basic fighting unit is the Air Base Ground Defense Flight which consists of 44 personnel and is composed of a five person headquarters element and three thirteen person squads (designated as Squad 1, 2 and 3) (19:13). The headquarters element consists of the Flight Leader, Flight Sergeant, and three Radio-Telephone Operators (RATELO's). Each of the squads consists of a squad leader and three four person fire teams (designated as Alpha, Bravo and Charlie fire teams) (19:13). The Heavy Weapons Section is composed of separate teams which are organized on the basis of specialized training in the use and employment of specific ground combat weapons that are not organic (or assigned) to the ABGD Flights. These specialized teams are: 81 millimeter (mm) mortar teams, fire direction control (FDC) centers, 90mm recoilless rifle teams and 50 caliber machine gun teams (19:14). An Air Base Ground Defense Squadron

Headquarters serves as the basic tactical headquarters which plans, coordinates, and controls the ground defense effort at the respective air base. It consists of a headquarters squadron administration (S1) branch, an operations (S3) branch, and a logistics (S4) branch (19:15-16). In a wartime tasking, these air base ground defense forces are used to reinforce forces at existing USAF installations or can be brought together to form squadrons or groups at a bare base environment. The actual size of the total force would depend upon the location of the air base, the current threat, and the current tactical situation.

Weapons and Equipment of ABGD Forces

The organic weapons assigned to ABGD flights depends on whether the flights are being tasked for mounted (mobile) or dismounted (foot) operations (19:15). All nine fire teams of an ABGD flight in the dismounted role are assigned one M-203 grenade launcher (attached to an M-16 rifle) (19:15). Bravo fire teams are assigned an M-60 machine gun and the remaining members of the flight carry M-16 rifles (19:15). Flights in a mounted or mobile role are armed the same as described above except that Alpha and Charlie fire teams are assigned an MK-19 automatic 40mm grenade launcher (19:15). The flights organized to perform in a mounted role are also assigned 10 high mobility multipurpose wheeled vehicles (HMMWV). The ABGD flights

are also equipped with hand grenades, slap flares, trip flares, M18A1 Claymore Mines, and M72A2 Light AntiArmor Weapons (LAAWs) (21:104-110). The heavy weapons teams are armed with their respective heavy weapons: the M-2 Browning 50 caliber machine gun, 90mm recoilless rifle and the 81mm mortar (19:76-82). In addition to the HMMWV vehicles, ABGD forces also use M151 jeeps and 2 1/2 ton trucks (19:13-16).

Fundamentals of the Defense

The ABGD operational doctrine revolves around five basic defensive principles: aggressive defense, defense-in-depth, all-around defense, integrated defense, and defense organized around key terrain (19:10). Aggressive defense means that ABGD forces must seize the initiative from enemy forces and engage them as far as possible from the air base (19:10). It implies taking the fight to the enemy so as to deny him a stand-off capability. Defense-in-depth means that units should be positioned in such a manner as to form a network of successive defensive strongpoints around the air base (19:10). As the enemy force penetrates one line of defense they will have to face others during their march to the objective. All-around defense means that ABGD forces must be prepared to repel an enemy attack from any direction (19:10). This fundamental takes into consideration the fact that an air base is subject to an attack from any direction on its 360 degree perimeter. Integrated defense means that units must be positioned

laterally and in-depth so as to provide mutual support between friendly forces (19:10). Defense organized around key terrain means that ABGD forces will physically occupy or control by direct fire key terrain features around the air base (19:10). This fundamental is important, because it denies to the enemy the advantage of key terrain features.

Distributed Area Defense Doctrine

The five defensive fundamentals are implemented with the Distributed Area Defense (DAD) Doctrine (19:69). This operational doctrine involves the use of widely dispersed mounted and dismounted small units. These units are deployed laterally and in-depth and they occupy key terrain features on and off base (19:10).

The DAD Doctrine breaks the area of operations around the air base into three areas; screening force area (SFA), main defense area (MDA) and the close defense area (CDA) (19:11). The screening force area is the first area of defense and involves activities to detect, delay, disorganize, and destroy the enemy before he reaches the main defense area (19:11). The main defense area (MDA) is the second area of defense and is designed to give the ABGD forces the space needed to stop or destroy attacking enemy forces before they can effectively engage the air base (19:11). This area extends from the perimeter of the air base outwards to a distance of 3 to 5 kilometers from the

boundary (19:11). The close defense area (CDA) is the last area of defense between the enemy and USAF resources, and it usually parallels the base boundary (19:11). This area includes a final protective line (usually corresponding to the base perimeter) and security efforts to provide close physical protection of USAF resources (19:11-12). This area also includes the mobile response force (MRF) who is tasked with a runway denial mission and response missions to ABGD forces in the MDA.

Joint Force Initiative No. 8 of the Army/Air Force Chief of Staff Memorandum of Agreement, signed 22 May 1984, tasked the Army Military Police (MP) to conduct operations outside of the perimeter of air bases in future conflicts as part of their area security mission (20:3, 6). Based upon the provisions of the MOA, MPs have been tasked to provide forces for the screening force area (SFA) and the main defense area (MDA) while USAF SPs are tasked to provide forces for the close defense area (CDA) and internal security (20:5). However, the SP forces must continue to train and be equipped to operate in the MDA in the event that MDA forces (Army or Host Nation) are not in place at the outbreak of hostilities (60:2).

Concept of Operations

The ABGD concept of operations involves efforts to layer the defenses and activities of four instrumental DAD forces: the screening force, the main defense force, the

close defense force and the mobile reserve force (19:16-19).

Screening Force. Screening forces use a series of active foot and mobile patrols, observation posts (OP) and listening posts (LP) to provide early detection of approaching enemy forces (19:16). OPs (daylight hours) and LPs (during hours of darkness or limited visibility) are placed on key terrain features near likely avenues of approach in front of the MDA perimeter. The areas between the OPs and LPs will be covered by patrols. If an enemy force is detected, the screening force provides timely warning of the enemy's approach (19:16). Then, depending upon the tactical situation, the screening force may gain and maintain visual contact with and report the movement of the enemy force, engage small enemy forces or conduct delaying actions against larger units (19:16). The OPs and LPs should also be equipped with remote sensors, ground surveillance radar (GSR), night vision goggles, and night vision devices to enhance their detection capability (19:16). The ABGD force commander may also consider the use of military working dog (MWD) teams in the screening force area (19:26). The dogs' keen senses will enhance the detection capability of forces in the screening force area. Soviet experience with military exercises against their own Spetsnaz forces demonstrates that dogs are extremely effective against these small size forces, and the Soviets use them frequently in their operations (81:1214).

Main Defense Force. These forces operate in the main defense area (MDA) and are assigned defensive responsibilities for specific portions or sectors of the perimeter (19:18). The main defense forces (MDF) primarily consists of mounted ABGD flights. The MDF usually occupies the terrain from 3 to 5 kilometers from the base boundary (19:18). However, during low threat periods (to include possible level I or II forces) and during the hours of darkness the MDF may draw its forces back and operate within 2 kilometers of the base perimeter (60:2). When the tactical situation reveals a possible threat level III force, the MDF expands to 5 kilometers (60:2). The concept of operations for the MDF force involves the use of a series of mutually supporting fixed fighting positions and mobile patrols (19:19). In the event enemy forces are detected by the screening forces, the MDF would engage with the mobility and firepower of HMMWV vehicles with mounted MK-19 automatic grenade launchers and M-60 machine guns. It would attempt to destroy the enemy or canalize him into the fields of fire of the fixed fighting positions. In the event that the MDF forces are not mobilized, they would establish a series of well prepared fixed fighting positions with interlocking fields of fire and mutual support (24:4-5,4-6) throughout their sector and generate foot patrols to supplement the fixed positions (19:18-19). The ABGD organic mortars will be employed to support the MDF forces (19:19). To ensure immediate fire support the

MDF forces must preplan their use of mortar support by establishing a series of target reference points (TRPs) throughout their sector of responsibility (19:19; 24:4-15). The organic mortars can provide illumination rounds to help with detection during hours of darkness or limited visibility, high explosives to engage enemy forces, smoke rounds to help the movement of forces throughout the sector, and star parachute rounds to signal the movement of forces within the sector (19:19).

Close Defense Force. The close defense forces (CDF) perform internal security missions such as physical security of aircraft, POL facilities, command and control facilities, munitions storage sites, and other high target areas (19:19). These forces also provide well prepared fixed fighting positions along the perimeter of the air base which forms the final protective line (FPL) for the base (19:19). During a large scale attack, the FPL is the point or boundary to which all forces pull back and concentrate their firepower to take a final stand against an enemy attack. The CDF will engage enemy forces that have fought their way through the screening forces and the main defense forces (MDF) and reached the base perimeter (19:19). These forces also provide base entry control and law enforcement support to the air base (19:19).

Mobile Reserve Force. The mobile reserve force is made up of several mounted ABGD flights (19:19). They are tasked with the mission of runway denial and supporting

the ABGD flights in the sectors (the MDFs) (19:19). As part of their runway denial mission they prepare a series of fixed fighting positions with interlocking fields of fire that cover the runway and the flat and level areas of the base in the vicinity of the runway. This mission is designed to defeat an airmobile or airborne operation which would use the flight line area as its landing zone (LZ) or drop zone (DZ). In the event that a sector comes under attack, the MRF responds to the sector and establishes a blocking force to stop the momentum of the attack (19:19). Once the enemy force is fixed, the MRF in conjunction with the MDFs will begin to use fire and maneuver techniques to destroy the enemy force. The MRF can also be used to conduct counterattack operations to regain critical battle positions or terrain (19:19).

Urban Combat Operations

Many of our existing air bases in forward areas have numerous urban structures to accommodate the normal day to day business of the installation and to provide living quarters for personnel. Although these structures are not normally considered to be in any battle area, it is possible that during an attack enemy forces may either be trapped in the area of these facilities or seek to escape through these areas. Consequently, ABGD forces may have to perform urban combat missions on these facilities to extract or destroy enemy forces.

Urban terrain consists mainly of man-made structures and has some unique characteristics (25:1-9). Buildings provide cover and concealment, limit fields of observation and fire, and block movement (25:1-9). Buildings with thick walls are excellent fortified positions and the streets generally form avenues of approach (25:1-9). Underground systems such as sewers, cellars and utility systems can have an important impact on tactical operations in urban terrain (25:1-9). Most of our air bases have facilities and structures similar to these. In the event enemy forces were to occupy any of these facilities our ABGD forces may find themselves fighting an urban battle.

In urban combat, the building or buildings where enemy forces have assumed defensive positions will need to be isolated so that the defenders can not escape and reinforcements can not effectively reach them (25:3-38). The fire of the defenders will have to be suppressed (25:3-38). ABGD forces could accomplish this with M-60 machine gun fire and 40mm grenades fired from the M-203 grenade launcher or the MK-19 automatic grenade launcher. The purpose of the suppression fire is to allow friendly forces to enter the building through a weak point in the defense in such areas as windows, doors or battle damage holes to the structure (25:3-38). The building will need to be cleared floor by floor and room by room. The preferred method is to start at the top and clear the building downwards (26:3-38). When fighting an urban battle,

friendly forces should move through buildings or along walls and station men on roofs or upper stories of other buildings to provide an overwatch for their movement (25:3-39).

VI. Wargames

Wargames are devices that simulate conflict or combat between two or more opposing sides. Central to their design are the interplay of human decisions and game events (72:1). If properly designed a war game can be a tool for obtaining insights into the dynamics of warfare (72:2). War is a very complex and uncertain affair, and wargames provide an interactive model to help examine the actions and reactions, measures and countermeasures involved in the dynamics of war (82:146). Because of their interactive nature wargames are best suited to investigate processes rather than to calculate outcomes.

Their unsuitability for determining outcomes is outweighed by their more valuable characteristics. The use of wargames allows military personnel to study and prepare for war by evaluating military concepts during peacetime (44:4). They can help players to achieve a number of objectives. Wargames present a variety of strategic, operational, and tactical problems which challenge players' analytical skills (74:67). Wargames also permit players to relive historic events and develop an appreciation for history. Wargames provide a bloodless testing ground for new tactical approaches to future conflict (74:67). They offer a training ground to develop and test tactical skills of combat leaders at all levels of command (74:67). They

have the potential to highlight mistakes and permit replay of historic battles so as to study potential lessons from those situations (74:67). These historic battles can be altered to allow the players to see what might have happened had such things as forces and weather been different at the time of the battle (74:67).

There are three types of wargames. Each has a distinguishable playing surface. The oldest school of wargaming uses miniature models of soldiers and military equipment and is played on highly detailed three dimensional terrain models or sand tables (47:569; 48:13). While miniature wargaming is visually attractive the collectors are usually limited in the scope of conflict that they can represent because the miniature playing pieces are quite expensive (71:14). The second type of wargame is the map based board game. This is the most popular among hobbyists today (47:570). It has the widest audience because of its flexibility and low cost. The physical components include paper or cardboard maps and markers. The low cost of manufacture and ease of modification to many different combat situations has aided the popularization of this type of wargame (47:570; 71:14). The third type of wargame is the computer based wargame. It is quickly matching the popularity of board gaming with designers and hobbyists (47:570). The proliferation of personal computers has significantly

impacted this type of wargame and increased its popularity and attractiveness.

Wargames can represent four levels of military operations: strategic, operational, tactical, and sub-tactical (74:68). The strategic level wargames are played at the national or state level and involve armies or corps size forces (74:69). Operational wargames usually depict conflict between forces ranging in size from battalion up to division. Tactical wargames represent combat from company size forces down to squads. Sub-tactical level games generally involve single soldiers (man-to-man combat) and crew served weapons (74:68).

The complexity of wargames is often a function of the amount of realism incorporated into the game. The complexity of wargames is determined by game rules and can range from simple to extremely difficult (74:68). Complex games require logical thought and attention to detail (74:68). If realism is to be achieved in a tactical level game, the ranges of weapons, armor skin, speed, mobility, morale, fatigue, and leadership ability are all important factors which have an impact on the complexity level of the game (74:68). The complexity level of a wargame also determines the playability of the game; the more complex the game is, the less playable it is. The following rating scale has been developed by the commercial wargames

industry to help users determine the complexity of wargames before purchasing them (84:5-6):

- 1-3 Very Easy
- 4-5 Challenging for beginners
- 6-7 For experienced players
- 7-8 Complex
- 9-10 Highly skilled players and history buffs.

The practicality of the complexity rating scale is that players should attempt to play games within their experience level and progress upwards in complexity as their experience increases. Often beginners make the mistake of trying to learn and play a wargame which was designed for an experienced or veteran wargamer (36:10). This usually proves to be a frustrating experience for the beginner and causes many to give up the hobby before really getting started. Veteran wargamers recommend that beginners start out with a rather simple wargame and gradually progress to the more complex games (36:10).

Historical Development

The earliest wargames appear to predate written history. Figurines and wall paintings depicting games of warfare have been discovered in tombs and remains of ancient civilizations of 3,000 to 4,000 years ago (64:24-25). Archeological explorations have found game boards and

symbolic representations of soldiers and military equipment in Greece, Egypt, Persia, China and India (13:45). One of the earliest wargames was Wei-Hai, usually called Go (48:21; 69:7). This game was a very abstract representation of war and was an influence in the political and military strategy of Chinese leader Mao Tse-Tung (48:21). He reportedly used the game to illustrate his strategies of guerrilla warfare (82:146). Another ancient wargame is the Indian game Chaturanga which is Sanskrit for "The Army Game." It incorporated the four arms used in ancient Indian warfare - elephants, chariots, cavalry and infantry (48:21). The board used in Chaturanga was a near representation of terrain, and the use of dice for movement introduced the element of probability into the game (48:21). It is believed that Chess in its various forms evolved from Chaturanga (82:146; 48:21).

During the Renaissance period from the fourteenth through the seventeenth centuries some significant changes occurred in these early wargames (64:25; 48:21). These changes were generated by advances in the art of warfare and in military weapons and equipment (64:25). In 1614 Alberto Struzzi constructed a wooden army for the future Philip IV of Spain which was complete even down to the pontoon train and tents for the barbers, sutlers and armoures (48:22). His replica included terrain with lakes, woods and a castle to besiege. In a descriptive pamphlet Struzzi claimed that the game could be used for military

instruction (48:22). In 1664 Christopher Weikmann developed the Kings Game in Prussia (64:25). This game was a modification of chess and was called military or war chess (64:25). It is believed that the game was designed to serve as a study of the military and political principles of that time period (64:25). It was a two player game with 30 military pieces on each side representing 13 functional specialties and the game had 14 different movement strategies or rules (64:25; 13:48). The Kings Game is considered to be a major milestone in the development of wargames because of its realism and ability to reflect the latest techniques in warfare (64:25; 48:22).

Another milestone in the development of wargames occurred in 1780 when Helwig, Master of the Pages to the Duke of Brunswick designed a wargame with 120 fighting pieces representing various military units (48:22; 64:25; 71:16). Helwig's game was developed to train young men of royal blood as future army officers (64:25-26). The game included infantry battalions, cavalry squadrons and batteries of artillery and was played on a terrain of 1,666 squares (48:22). Different aspects of terrain along with lakes and villages were represented by tinting the squares of the gameboard (64:26).

In 1798, George Vinturinus, a military writer from Schleswig, developed a more complex wargame on an actual map covering the France-Belgian border (71:16). The board had 3600 squares and a number of innovations to include

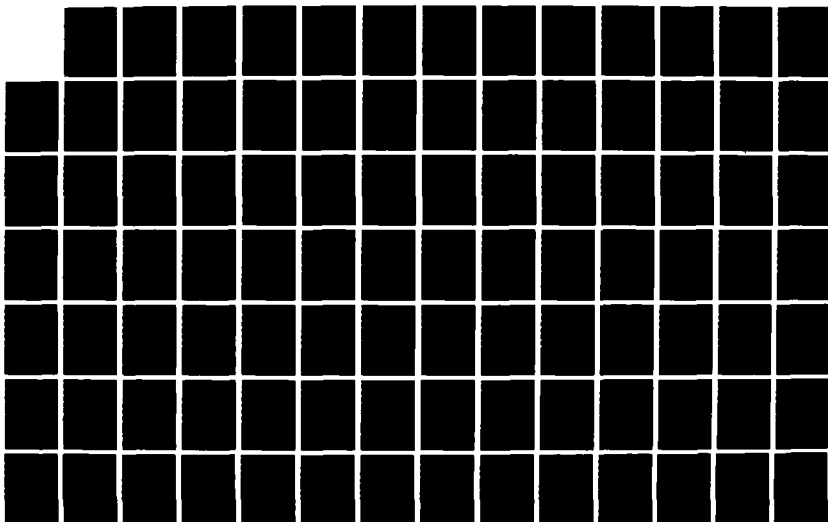
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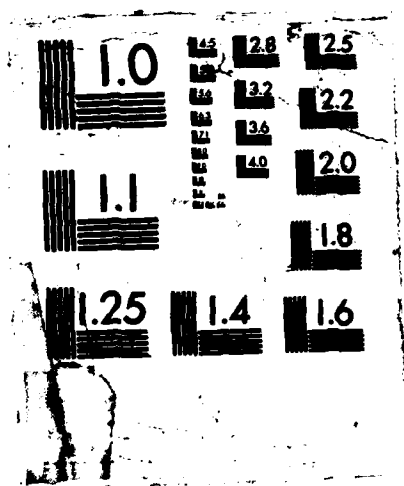
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military supplies and communication lines (71:16). This game introduced wargame play on more realistic terrain characteristics (an actual map) and it expanded the types of combat forms. The game also had restraints on play imposed by logistics and environmental factors (64:26).

The wargame as it is recognized today was originated in Prussia by the von Reisswitzs when they developed Kriegspiel, the military game (64:26). In 1811 Lieutenant von Reisswitz's father designed a wargame using miniature military figures and a sand table with a ruler to work out distances (71:16). This effort represented a truly professional attempt to develop the war game into a useful and practical military training and planning device (64:27). The game was initially played on a sand table but the playing surface was later modeled using plaster complete with lakes, rivers, roads, villages, and forests represented in color (64:27). Movement of the military personnel and equipment was no longer restricted to squares, and this resulted in more realistic maneuvering of forces (64:27). In 1824, Lt von Reisswitz, a Prussian artillery officer adapted the game to military operations by transferring the game to a military map with a scale of 1:8000 (64:27; 71:16). He published a set of detailed rules for playing the game on the map charts (64:27; 71:16). Lt von Reisswitz also developed the first time scale (2 minutes per move) and reintroduced the use of dice and historically based tables to decide the winner (48:22-

23). In 1824 Lt von Reisswitz demonstrated the game to the Chief of Staff, General von Muffling who was impressed with the game and exclaimed that "It is not a game at all. It is a training for war!" (71:16-17). General von Muffling arranged for every regiment in the Prussian Army to be furnished a set and urged them to practice with it (71:17).

After the Prussian campaigns of 1866 against Austria and the Franco-Prussia War of 1870-1871, the world began to study the Prussian methods to determine their formula for victory. Their most notable training method was the use of Kriegspiel, wargaming (71:17). Their successful use of wargaming illustrated the potential of wargames and starting in 1872, Kriegspiel, in various forms and modifications, began to spread to practically every major nation of the world (64:27). As the game continued in use many felt that as it was being practiced it did not adequately represent the many variables found in actual combat (64:28). In 1876, Colonel von Verdy du Vernois a prominent instructor in the German army, modified the current wargame by adding free play and less detailed rules (64:28; 13:48). His system placed great burden on the game director or umpire as the judge of engagement outcomes (64:28). One of the main problems with the umpire dominated game was that it tended to reinforce and force upon others the umpire's prejudices (48:23).

The first major gaming effort in the US appeared in 1879 when William R. Livermore, a major in the Corps of

Engineers, published his book, The American Kriegspiel (64:28). Livermore developed the game primarily from the writings of von Tschischwitz, an instrumental figure in war game development in the German Army during the mid 1800s (64:28). Livermore's game was developed with the assistance of Captain Hugh G. Brown of the 12th infantry, a veteran of the Civil War. It was considered a significant improvement over previous attempts (64:28). It used topographical maps, colored pieces to represent forces and a game director or umpire (64:28-29). The game was played from three different rooms and used maps, charts, and logarithmic tables to control movement of forces and to determine losses and the effects of weapon's fire (64:29). These tables were based upon operations of the Civil War as well as other combat experiences (64:29). As a training device the war game was well established by the beginning of the twentieth century (64:29). In the US, the military wargaming tradition began in the 1890s with the use of war games by the Naval War College.

The use of wargames was credited with contributing to a number of military successes. The most notable was the Japanese victory over Russia in 1904-1905 for which the Japanese had carefully prepared with wargames (71:17; 82:146). The use of wargames to train and to test operational plans was widespread during World War I (1914-1918) (64:29). Both Germany and Russia tested military plans for an anticipated engagement between the two

countries (64:29). In one instance the Russian gaming activities clearly pointed out a flaw of timing for the coordinated attack by two Russian forces in a pincer movement against the Germans, and the German wargames supported their plans of operations (64:29). The Russian commanders disregarded the flaws pointed out by their wargame. The result of the actual engagement, the Battle of Tennenberg in August 1914, proved disastrous for the numerically superior Russian forces (64:29-30). During the period following World War I, military gaming gained increasing emphasis throughout the major nations of the world and particularly in Germany (64:30).

During World War II (1939-1945) the use of wargames to test operational plans was commonplace in Germany and Japan. There was also some active involvement by the US and Great Britain (64:30-31). Such plans as the attack on France, the invasion of Russia, the Ardennes attack (Battle of The Bulge), and U-boat tactics against allied shipping were all gamed by the Germans prior to execution (64:31). In 1939 German wargames demonstrated that it was possible to make a speedy breakthrough in the Ardennes to turn the Maginot Line (71:17). After the fall of France, a wargame illustrated numerous insuperable obstacles to a successful invasion of Britain (71:17-18). When the Russians were attacked, the operation was gamed in detail prior to implementation (71:17-18). During November 1944 one German game had the unique feature that it became real

life (71:18). The 5th Panzer Army defending Germany's western approaches was in the process of wargaming an anticipated American attack when the attack began (71:18). Model, the Army Group Commander in the area, ordered the game to continue with up-to-the-minute news from the front. The decisions resulting from the game were rushed to the front for application (71:18).

The Japanese also relied heavily on war games during World War II to test their operational plans prior to finalizing and implementing (64:31; 13:49). The Total War Research Institute was established in Tokyo in 1940 for the purpose of determining Japan's future military and diplomatic courses of action (64:31; 13:49). The surprise attack on Pearl Harbor on 7 December 1941 was gamed by the Japanese at the War College in Tokyo months prior to its execution (64:31). A significant result of these games was the determination that Japanese plane mounted torpedoes could not be used inside Pearl Harbor because of its relatively shallow depth (64:31). Consequently, stabilizing blades were mounted on the rear fins of the torpedoes to keep them from diving too deep once released from the plane. This greatly enhanced the effectiveness of Japan's attack (57:24; 64:31).

Later, Japanese efforts to use wargaming to simulate the Battle of Midway were less successful because the umpires did not allow the game to proceed unhindered (57:24). In this very elaborate game, the Japanese naval

officers playing the Americans launched an attack on the Japanese carrier force and inflicted devastating losses on it (57:24). When two of the Japanese carriers were sunk in the game, Admiral Ugaki objected to the umpires ruling, and the carriers were declared safe and "refloated." (57:24-25). The game continued and indicated the victory at Midway that the senior Japanese officers felt was inevitable (57:25). However, during the real battle, the Japanese carrier force was struck almost precisely as indicated by the earlier wargame but with a more disastrous result for the Japanese since all four carriers were lost (57:25). This very defeat of the Japanese carrier force was foreseen earlier in the wargame (47:581).

The allies were also actively engaged in wargaming during World War II although not to the same extent as the Germans and Japanese (64:32). The experience gained during this time period served as the foundation for the expansion of wargaming activities by the US and Great Britain at the conclusion of the war (64:32). The Allies used wargames to test some operational plans and as a research tool to test new concepts and ideas (64:32). The mining of Japan's harbors and the routing and escorting of Allied ocean transport traffic were two areas in which gaming played a key role (64:32).

Since World War II the US has been the pace-maker in the use of wargames. Computer technology and sophisticated communications equipment with well defined rules and

detailed calculation systems have replaced the freewheeling and arbitrary umpire systems (71:18). During the past two decades the growth of wargaming activities, manual as well as computerized, has occurred at a furious pace. These activities represent all types of land, sea, and air warfare in various levels of intensity including cold war, limited war, counterinsurgency, global war, and nuclear war (64:33). Manual war gaming is used, operationally and instructionally, in the majority of the service schools in the Army's Training and Doctrine Command (TRADOC) such as the Command and General Staff College and the Army War College (64:33). The proliferation of wargame use has been extended into the Army's tactical units with games depicting corps to platoon level combat operations (64:33).

The post-war period also saw the reintroduction of board wargames for entertainment (71:18). Commercial board wargames were first introduced in 1953 by Charles Roberts when he developed the game Tactics (71:18). Roberts succeeded in selling 2,000 copies and in 1958 decided to enter professional game design and established the Avalon Hill Game Company, which remains one of the giants in the industry (71:18). Roberts went on to publish three additional games: Gettysburg, Stalingrad and Waterloo. They are still popular among commercial wargamers (71:18). In 1969, a former Avalon Hill game designer, James Dunnigan set up his own company, Simulations Publications, Incorporated (SPI) and published his first game (71:19).

By 1975 SPI was selling 385,000 games a year and AH was selling just under 300,000 per year (71:19). Today there a number of companies in the industry and commercial wargames span the ages from early Rome to the 20th century and futuristic science fiction empires (84:5-4).

Basic Components of Wargames

Board type wargames have four basic components. A playing board represents the battlefield. Cardboard counters represent military units or equipment, and the last two components are a set of rules and a die or dice (74:68). Depending upon the scope of the game the map may represent an entire nation or only a few kilometers of terrain (74:68). The maps can contain various types of terrain features such as towering mountains, thick jungles and villages (71:23). The board usually has a grid of six-sided spaces (hexagons) superimposed to control the rate of movement (74:68; 71:23). Instead of measuring distances as is done in miniature wargaming, the grid system allows players to count hexagons for movement (71:26). Squares were used in the early days of wargames, but movement was not permitted through the corners. The results were unrealistic zigzags over the map formed by a series of straight lines and right angled turns (71:26). The use of the hexagons permits a more flexible and realistic movement system.

Each unit in the battle is represented by a square cardboard counter of a size that will fit in the map hexes, and they are usually mounted for better durability (71:26). Depending upon the scope of the game the counters may represent one soldier or large units such as divisions or corps (74:68). The counter has information printed on one or both sides pertaining to the unit's identification (type and size), attack/defense strength, movement or speed factor; it may also contain other important data (74:68; 71:26). Each side's counters are identifiable by the color of the counter (71:26). The most important information on the counter, apart from the nationality, is usually expressed in two or three figures at the bottom such as 6-3 or 6-4-3 (71:27). The first figure is normally the combat factor; if there are three numbers, then the first two will both be combat factors, giving attack and defense strength respectively. Otherwise the attack and defense strengths are identical (71:27). The last figure is the movement factor. It reveals speed of the unit's movement (71:27). The movement factor is used in conjunction with the hex grid system and terrain modifications (71:27). In most games, a player can have more than one unit on a hex, as long as they are on the same side; this is called stacking (71:27). However, there are nearly always limits which are dictated by real life considerations (71:27-28). Units on opposite sides are normally forbidden to occupy the same hex at the same time (71:28).

The rules of each wargame contain all of the instructions and charts needed for play (74:68). They guide the playing action and control the movement and combat effects of the opposing sides. The rules usually include two important charts: the Terrain Effects Chart and the Combat Results Tables. The Terrain Effects Chart relates the effects of various types of terrain on movement and combat interaction. The Combat Results Table (CRT) is a probability table that establishes a combat value ratio based upon the assessed strengths of the various engaged units (38:15-17).

Playing Mechanics of Wargames

The mechanics of wargames, which represent various elements of war, are comprised of a number of major playing systems designed into the game (47:571). These systems include movement systems; combat systems; supply systems; command, control and communications systems; and intelligence systems. The movement system controls the rate of movement of the units in the game. The rates of travel of military units and equipment over a variety of landforms or upon bodies of water or in the air under various conditions are generally known (47:571). These rates are given values corresponding to the scale of the playing field and the speed of time passage simulated in the game. The ability of the players to use the full "movement allowance" of their forces is modified by the

type of terrain, the type of force, and in the more sophisticated designs by any number of other factors such as weather, supply availability, unit density, command status, morale, and unit exhaustion (47:571).

The combat system controls the combat interaction of the opposing forces in the game. The strengths of combat forces are quantified, and these simple strengths may again be subject to modification on the basis of variables similar to those discussed under movement (47:571). When enemy units get within shooting range of each other fighting naturally tends to break out; in some games this is compulsory and in others it is the decision of either one or both of the players (71:28). When an engagement occurs, the combat factors of the units on each side are added together; and the attacker's total is divided by the defender's to get a simple ratio like 1:2 or 7:1 (71:28). This ratio is then modified to include the effects of terrain and other factors on combat (71:31). Having the final ratio of strength, the players consult the Combat Results Table (CRT) and a die is thrown to decide which of the six outcomes or columns of the CRT will be used to determine the outcome of the engagement (47:572; 71:28). The throwing of the die introduces the element of chance and chance is basic to the resolution of combat (47:574). Much of what wargames reduce to chance is the product of thousands of decisions by individuals at every stage of the action in real life (47:574). The game designer has to

aggregate all minor decisions into masses that can be dealt with through the application of chance and an outcome matrix (47:574). The matrix or CRT not only decides the victor, but also the form of victory in terms of casualties and/or possession of territory (47:572).

In most combat systems, units usually have an effect on the six adjacent hexes which are referred to as their zone of control (ZOC) (71:31). In some designs enemy units entering a zone of control (ZOC) have to stop movement. In some cases they must fight (71:31). However, others allow very fast units to slip through a ZOC after a movement delay. The use of a ZOC is made possible because of the influence of modern weapons on the battlefield (71:31).

Another system which is fairly common in the simulation of an element of war is the logistics or supply system (47:572). Supply systems can be used to effect movement and combat. Some games require the players to keep their units within a certain distance of a particular location (supply depot) on the playing field (47:572). Other game designs use very detailed systems to represent the impact of various levels of supply on a military situation. Impacts can take the form of morale and force capability changes (47:572).

The most insightful and useful treatments of command, control and communications (C3) system have come about in the last few years. Ironically they appeared at about the

same time the subject became a major issue in American military circles (47:572).

Games based upon smaller scale engagements tend to stress the effects of leadership, morale, initiative and unit cohesion of the military forces involved (47:572).

In war, every consideration is given to grasping the purpose and plans of the enemy (47:574). The intelligence systems designed into wargames demonstrate the importance of intelligence on military operations. A properly designed intelligence system reveals uncertainties inherent in this the most demanding of all human activities; modern warfare (47:574). Crucial to the use of intelligence systems is the "fog of war" (47:576). This is an outgrowth of having an active opponent on the battlefield. It involves not knowing what the enemy's intentions are, where he can be found or how strong he will be at the point of contact (47:576).

Methods of Play

While there are a number of ways to play wargames, there are four dominate methods of play in use today. The first method involves having all forces placed face up on the game board or playing map. This immediately gives both players the order of battle (the types and strengths of forces) and their locations. Some games allow units to remain off the board, although they are still governed by specific rules of the game. This method of play is

primarily used to enhance playability and is usually found in simple or low complexity games.

A second method of play is for the players to place the units face down on the game board or to place cover markers over the unit counters (74:71; 47:577). This would serve to hide the full order of battle and conceal the attack/movement factors of the various units (74:71). In this method of play, both players would know the locations of the units but would not know what types of units are in those locations. Nor would they know what their respective attack and defensive strengths are until those units are challenged with combat. A variant of this method uses dummy markers to mislead the opponent about the location of actual units (47:577). Another variation of concealment uses an umpire who supplies each player with limited intelligence about the disposition of the unknown units (74:71).

A third method of play involves the use of hidden movement (47:578). This method allows each player to keep a small portion of their forces off the map or game board. This form of play usually requires each player to make detailed notes on the movement of their hidden forces and an umpire is necessary to monitor the movement of these forces. The umpire in this situation ensures that all movement of the hidden units conforms to the rules and he notifies each player when they have come in contact with an enemy unit (47:578).

A fourth method of play is referred to as the umpired blind system (74:71; 47:577). Under this method of play the players set up their forces on identical playing fields isolated from each other. The umpire uses an identical board, sets up the positions of all forces, and then shadows the players moves and other actions (47:577). Each side will maneuver across the terrain and learn about its opponent's positions and forces only through information passed by the umpire. As the game progresses, enemy units are "discovered" as friendly forces move into contact with them (47:577). The umpire resolves combat and other interactions between the opponents (47:577). Once the enemy units are spotted they are placed on the opponents gameboard until, rules permitting that unit can loose contact again (74:71). A variation of this method allows the umpire to have an influence outside of the rules (74:71). For example, an umpire could declare that rain in one sector has cut movement factors of armor in half or he might inject surprise by declaring a bridge destroyed and unavailable or he could possibly deliver incorrect or garbled messages to one player while giving the correct information to the other player (74:71). While these measures can induce reality into the game, they are kept to a minimum so that games do not end in unrealistic victories or become too complex or too slow to sustain the interest of players (74:72).

Advantages

There are a number of advantages to using wargames. Wargames can help us understand dynamic processes (14:3). War by its very nature is a dynamic process in that forces move, become damaged, run out of supplies, and are subject to numerous changes as the conflict proceeds (14:3-4). Setting up a wargame is one way of acting out this situation and attempting to reproduce the decision making environment under those conditions. Understanding the dynamics of warfare has several benefits. First, it allows military staffs to formulate force postures and doctrine for future conflicts (14:3). It can also help us to understand the causes and means of prevention of war by increasing our awareness and offering new insights (82:153).

Another advantage of wargames is that they offer unique opportunities for understanding the interactions among different types of forces (14:5-6). In actual combat all services must act together towards common goals. Suitably designed wargames offer a good way of breaking down existing barriers among the various services (14:6). As a planning tool wargames can save tremendous amounts of money and labor by simulating several scenarios and allowing the comparison of results before making final decisions (12:32).

Disadvantages

Wargames also suffer some disadvantages. One of the major problems is that the results of a given wargame are often difficult, if not impossible, to reproduce (14:9). The game results are the product of numerous individual decisions made by the players and controllers coupled with random numbers (14:9). Without maintaining a log or turn by turn documentation of the game events, it is difficult to compare one play of a game with another (14:9). This situation can be corrected in part by establishing standards of documentation and procedures that will ensure the keeping of records while the game is actually being played (14:9). However, the documentation process tends to slow down the pace of the game.

Another disadvantage of wargames is that they provide only a limited opportunity for the introduction of problems that arise from human imperfections and equipment failures (64:105). The set-up time and administrative support can be burdensome for many wargames (64:105). Controller and player instructions and briefings can be rather lengthy due to elaborate and detailed rules of play (64:105). Additionally, slow board play as required in complex games that depict reality can cause players to loose interest (64:105).

Training Aspects

As a teaching tool, wargaming has advantages that few other teaching techniques offer (58:22). The use of wargames helps to overcome the barrier that separates theory from applications. The players can test theories by applying them to simulated situations and observe the results (58:22). War games allow the players to make decisions and learn from their mistakes without having to suffer the realities of poor decisions (58:22). The educational uses of wargames fall into three broad categories: they can be used as an original learning experience; they can reinforce information already given students through other mediums such as lectures, readings, etc.; or they can be used as an evaluative tool to assess the students understanding of and ability to apply information previously presented through other means (58:22).

Wargames place the players in a crisis leadership position and help them realize what leaders experience by simulating the leadership problems (58:23). Wargames allow players to understand the enemy's motivation and courses of actions by making "enemy" decisions under simulated combat conditions (58:23). The purpose of wargaming as a teaching device is not to train players on how to react to specific situations, but to make them aware of various factors that influence the outcome of conflict situations (58:25). By knowing what factors are important, the players will be

better prepared to develop real operational plans that will secure military objectives (58:25).

From a military standpoint the use of wargames as training devices offers some unique advantages over other forms of training (64:103). Wargames help to teach commanders and their staffs to carefully consider and allocate scarce resources such as weapon systems, air support, artillery, and nuclear weapons (64:104). Since planning deficiencies will normally be highlighted through the course of play, staff planning and coordination problems can be discovered and corrected (64:103). Wargames allow more junior leaders to develop a broader perspective of the overall concept of the battle by "commanding" higher level units (64:104). Wargames offer an excellent way to test and evaluate operational concepts and plans prior to execution (64:104). The impact of administrative and logistical concerns can be observed through the play of wargames (64:104). Austere facilities can be used to conduct training with wargames while avoiding such limitations as training area availability, restrictions within training areas, or understrength units which sometimes detract from field exercises (64:104). Wargames eliminate the costly troop and equipment usage typical of field training exercises (64:104). Additionally, wargames allow the application of a wide range of tactics, weapon systems, weather, and terrain conditions. One other valuable characteristic is the

wargame's ability to stimulate discussion on strategy, tactics, and doctrine (64:104).

In a 1979 study, the Army experienced success with a training program which used a board wargame device (77:33-37). The training program, called EFFTRAIN (effective and efficient training), was conducted in three phases (77:3). Phase 1 included the use of a board type wargame with two methods of play. The first method of play involved two single players with opposing missions using separate playing surfaces (77:4). The second method of play used a leader and subordinate on the same side with the subordinate handling all of the activities that he would normally be responsible for and communicating pertinent information of the situation to the platoon leader via a simulated radio (77:4). The leader only played the leader role and made his decisions based only upon the information that was relayed to him from the subordinate (77:4). The objectives of this phase were to emphasize communication skills, coordination skills, and command and control procedures necessary to conduct a combat mission successfully (77:4). Phase II of EFFTRAIN involved a field opposition exercise using only leadership personnel (77:6). Members had symbols affixed to their helmets. These figures represented various size units. They then conducted attack and defense missions without any troops (77:6). Phase III of EFFTRAIN involved the use of troops and REALTRAIN exercises (77:6). REALTRAIN exercises

involve normal field training exercises with the use of optical devices, telescopes, or plastic sighting plates mounted on individual weapons aligned with the weapon's sights (33:15). Gunners shoot at their targets by announcing the identification number worn by the personnel or displayed on vehicles that they have aligned in their sights (33:15). Controllers remove the simulated casualties and damaged or destroyed vehicles from the exercise. At the end of the training period, the EFFTRAIN platoon was tested in REALTRAIN exercises against a control group platoon which had trained during the same period using normal training methods. EFFTRAIN squads and platoons won 5 of 6 REALTRAIN exercises against non-EFFTRAIN units in spite of the fact that the situations were set up to give the non-EFFTRAIN units a force ratio advantage (77:17). The commander of the company involved in the training program felt that the use of the wargame helped the junior leaders to focus on weapon system capabilities and the complexities of conducting a tactical exercise (77:35). The battalion commander felt that the use of the game led to "tangible benefits" in the use of indirect fire, the development of techniques to minimize the effects of enemy weapons fire, improved command and control, and the ability to react quickly to enemy actions (77:35-36).

Although wargaming has a long history of extensive use, it still remains a controversial training technique

(57:25). Most proponents point to the historical successes, while the critics emphasize the lack of accuracy and precision found in wargames (57:25). However, hobbyist games have produced tantalizing examples of a predictable future (3:100). An Indochina game that James Dunnigan, former President of Simulations Publications, Inc. published in 1972 was played in Thailand by a group of American officials using top-secret information instead of the game's data which Dunnigan had found in the New York Times and Newsweek (3:100). An individual from the State Department told Dunnigan that there had been very little difference between playing the game with Dunnigan's information and playing with classified material (3:100). The game SINAI was originally published as a hypothetical scenario of a conflict in the middle east. However, two months after the game came out, the scenario turned into actual fact as the Yom Kippur War broke out. The order of battles predicted by the game, SINAI, correlated to the actual conflict (84:5-4; 3:100). Although one Israeli reserve unit was activated in a different city than the game predicted, the strengths and types of units matched perfectly. The Russian surface-to-air missiles were more effective in real life than SINAI predicted, but the Egyptian strategies indicated that they did not know this until late in the war (84:5-4).

Thomas B. Allen in his book War Games related that in 1983 Victory Games published Gulf Strike, a large complex

game designed by Mark Herman (3:108). A year later when Allen played the Persian Gulf game at the Naval War College, he compared the scenario for the war-college game to Herman's complex and stimulating game. Allen stated that he found it hard to believe that Herman's game was suppose to intrigue hobbyists while "the war colleges game was supposed to inspire informed thought about US strategy in the Middle East." (3:108).

When wargames are used as training devices, there are two issues that need to be considered by game designers; dis-training and transfer of training. The concept of dis-training involves the reinforcement of behaviors or actions that would not be advantageous in a real situation (62:7). These incorrect or faulty conclusions are possible because of the game design system (16:2). The amount of reality that can be portrayed in wargames is limited, and this often contributes to dis-training. The concept of transfer of training involves the ability to use a learned skill in a new setting or situation (85:381). Transfer of training is more likely to occur as the number of common variables in each situation (training and application) increases (10:409). Having common elements in the training situation and the real situation increases the tendency to elicit similar responses from the trainees (10:409). For example, if a Security Police fire team level wargame is played on a gameboard that accurately represents the terrain of the airfield that players will defend then they will think

about the terrain from a tactical perspective (16:1). Each time they are on patrol or conducting real maneuver exercises over the physical terrain of the airfield, their tactical knowledge and perceptions of the terrain developed through the use of the wargame will be applied or "transferred" to the current situation.

DOD Designed Wargames

There appears to be a number of problems with the design of wargames used by the Department of Defense (DOD). In 1980 James F. Dunnigan, a commercial wargame designer, was asked by Andrew W. Marshall the Director of the Pentagon's Net Assessment Center to develop a wargame depicting limited nuclear warfare (3:93). Marshall told Dunnigan that he was not satisfied with what he was getting from game designers working for the DOD (3:95). While working on the game, Strategic Analysis Simulation (SAS) Dunnigan asked a military game designer how they validated their games. The designer replied that they don't because they are normally under constraints. The designer stated "We are tasked by our decision makers to do certain things, and quite often that includes verifying a decision that has already been made." (3:95).

Dunnigan's previous DOD experience stemmed from his development of the game Firefight which was designed as an official US Army training device and later released as a hobbyist game (3:95). Dunnigan feels that the game for the

hobbyist is more realistic than the one for the real soldiers (3:95). Dunnigan designed Firefight for the Army in 1974 to train platoon leaders and company commanders. The game was based on US and Soviet tactics and weapons while pitting four-man US and Soviet fire teams against each other on a game map of either Fort Benning, Ga (site of the Army's Infantry School) or a training area in West Germany (3:95). Army ordered changes made the game unrealistic. Dunnigan stated that his historical research indicated that a small unit commander's ability to tightly control his troops was a sometimes thing. In game terms it simply meant that a certain percentage of the commander's orders would be ignored or misinterpreted (3:96). In 1976 someone in the Army chain of command did not want the issue of poor communications addressed in the game (3:96). The other factor suppressed was the underbrush (3:96). From detailed survey maps and personal reconnaissance by his staff of the Fort Benning site the game board included heavy underbrush areas and swamps (3:96). The result was that during the play of the game soldiers were having trouble finding and aiming at tanks (3:96). At the time the game was developed there was a lot of emphasis on long range killing power of anti-tank weapons and consequently, the swamps on the terrain maps "officially vanished" (3:96). The game was eventually dropped by the Army as being too complicated for play by its junior enlisted personnel (68:107).

In his book War Games, Thomas B. Allen cites an example of a scenario from one of NATO's nuclear games in which terrain degradation due to nuclear strikes appears as a blot over 830 square miles. The game does not have civilian panic, provisions for handling vast numbers of casualties, nor the sophisticated interplay of politics and warfare which is the hallmark of a good hobbyist game (3:99).

Mark Herman, a commercial wargame designer who has also worked on some DOD projects, believes that one of the main problems in DOD games is that "everyone moves around like robots. Nobody's tired. Nobody sleeps. Nobody eats." (3:105). Herman felt that DOD game designers seemed to concentrate on numbers or data instead of the more important design of the game systems (3:105). To illustrate the design of DOD games Herman cited an Israeli test of a US Army combat wargame model that was adapted to run a battle between an Israeli tank platoon and a Jordanian tank battalion (3:106). The model showed that the outnumbered Israelis would lose. However, in an actual battle the Israelis had won by forcing the Jordanians to retreat (3:106).

VII. Wargame Design

In his book, The Complete Wargames Handbook, James F. Dunnigan, the former President of Simulations Publications, Inc. stated that while there are many rules governing the design of wargames, two of those rules control all others (38:235). The first is to keep the game design simple. The second is to "plagiarize" or use available techniques (38:235-236). Dunnigan feels that using available techniques provides the game designer with a wide range of proven procedures (38:236).

The Design Process

The game design process is a very dynamic activity and involves ten basic steps (38:235). The first and most important step is concept development (38:239). In this phase the designer must determine exactly what it is that he wants to simulate and the particular aspect of the game that he wishes to spotlight (38:239). Generally, the more accurate the designer's perceptions regarding the critical elements in the battle or situation to be gamed, the better the game design.

The second step in the process is research. The designer may conduct some research in the first step while defining the scope of the project. However, this phase is intended to fill gaps in his knowledge about the battle or

situation to be gamed (38:239). The research endeavor should encompass books, magazines, newspaper articles, research papers and other materials that describe the order of battle of the historical event or situation to include maps of past campaigns. Technical material which describes the organization, weapons and tactics of the forces involved also needs to be studied (38:240). Research conducted from an enemy's point of view is also valuable when constructing a game design (38:240).

The third step in the design process is integration (38:244). In this phase the designer takes the research material and his knowledge of game mechanics and integrates them into a prototype game (38:244). The research material is used to develop the game components such as the map or gameboard, the order of battle for forces involved, the combat results table (CRT), and the terrain effects chart. It also allows the developer to determine combat strengths and movement allowances of each unit (38:244). The fourth step involves fleshing out the prototype game to come up with something that will closely resemble the finished product (38:236). This step is often conducted concurrently with step three while developing and refining the game components.

The fifth step in the wargame design process is to create and prepare a draft copy of the rules which will govern the play of the game (38:237). Most professional wargame designers begin with a set of rules from a previous

game similar to the one they are currently developing (38:250-251). They make modifications to these rules to fit the historical setting or situation of the new game.

The sixth step in the design process covers the process from game development through playtesting (38:251). Playtesting is the process of playing a new game design over and over so as to see how the game flows and how all of the components work together. The aim is to spot flaws in the game design and improve playability (38:251; 78:33). Generally, ninety percent of all game defects are corrected through proper playtesting (78:33). Playtesting should start with the designer and then it should involve other players. It is important to get players who realize that they are playtesting the game and are not playing to win (38:251). During this testing process necessary changes are made in the rules and playtesting continues with the modified rules (38:252).

The overall goal of playtesting is to build a game that has balance, variety, unpredictability, realism, and playability (78:33). The game should have balance so that all players will have an equal chance to win. In historical games where one side was the victor or loser by a wide margin, balance can be put into the game through the use of victory points (78:33). The game should provide variety and should not be predictable (78:33). If playtesting demonstrates there is one better way to win then the rules need to be changed. The game should provide

a degree of realism with the amount dependent upon the goal of the game (78:33). The last criterion is playability (78:33). This will include such things as clarity of the rules, the speed and ease of play, and the interestingness of the game (78:33).

The seventh step in the game design process is referred to as blind testing (38:252; 78:34). The modified prototype game and written rules are sent out to groups of wargamers or friends who play it just as if they had bought it from a store (38:252; 78:34). The game is played without the designer in attendance and the results of these playing sessions are incorporated into the rules or the design of the game (38:252; 78:34). After a few rounds of blind testing and revisions, the game will be finished.

The eighth step in the design process is necessary only if the game is to be published (38:237). This phase involves the editing of the final manuscript by an experienced individual other than the game designer to spot flaws in the written rules and other documents that will be distributed with the game (38:237). The ninth step is also not necessary unless the game is being designed for publication (38:237). In preparation for publication, the rules and other documents have to be typeset; and sometimes words or paragraphs can get scrambled or even dropped altogether during the typesetting process (38:237). Although this step is normally handled by the publisher it is highly recommended that the game designer carefully,

line by line, read the rules and other documents to ensure that the printed copies will accurately reflect the correct rules and information (38:253).

The tenth step is critical and involves feedback from players of the game (38:237). The designer must establish a systematic process to collect feedback from those who play the game after publication so that he can improve the design in future revisions (38:237).

Component Design

Map Scale and Movement. The map and the turn scales form the real basis of a war game (78:11). The designer's decisions on how much space to be represented by the map and the distance the units can move each turn represent a crucial aspect of game development. These decisions will to a large extent dictate the kind of Combat Results Table (CRT) to be used, the size of the basic unit to be represented, and the counter density (78:11). Scale is simply the representation of a proportion between two items. Large scale means that less area is represented in more detail and small scale means that more area is represented (78:11). There are a number of constraints on scale representation. The first is the fact that the human reach is only about three feet, therefore, a horizontal map should not be any more than 6 feet wide (78:11). Other constraints include the financial limit on the game's production and/or selling price, if it is to marketed, and

the amount of space that will normally be available for play (78:11). After the size of the physical map is determined the designer is again constrained in his selection of scale by the level of play: grand strategic, strategic, operational, tactical or sub-tactical (78:11).

The hexagon grid system has been the most successful design feature in wargaming because it gives the same distance of movement regardless of direction (78:11). However, there is a certain degree of distortion when units move in a straight line "against the grain" or the straight row of hexes (78:11). This distortion is relatively slight (about 20%) and it can either be "factored" in by adjusting the hex scale in the raw movement formula or simply ignored (78:11). The designer will usually set the grain against the axis of the two opposing forces to allow for more interesting play (78:12). Since the relationship between kilometers and miles is 16:10, the use of the standard 16mm hex allows for easier conversion between metric and English scales (78:12). This is particularly important if the designer is taking terrain off of standard maps which usually employ rounded scales (e.g. 1:50,000 or 1:100,000). Table 1 demonstrates the conversion of various map scales to the distance that each 16mm hex would represent under those respective scales.

Another movement system is the use of squares which represent a right-angled floor plan much better than hexagons (78:11). Some game designs use a system of area

movement in which the game board or map is divided into areas of varying shapes and sizes with each having a distinctive impact on movement (78:11).

Table 1. Various Map Scales and 16mm Hex Metric and English Equivalents (78:12)

If the Scale is:	Then One 16mm Hex Equals:		
	Meters	Yards	Miles
1:781.25	12.5	17	--
1:1,562.5	25	27.3	--
1:3,125	50	54.7	--
1:6,250	100	109.4	--
1:12,500	200	220	1/8
1:25,000	400	440	1/4
1:50,000	800	880	1/2
1:100,000	1.6km	--	1
1:250,000	4km	--	2.5
1:500,000	8km	--	5
1:1,000,000	16km	--	10
1:2,000,000	32km	--	20
1:5,000,000	80km	--	50
1:10,000,000	160km	--	100

The half inch counter is a good size for handling and permits easy visual clarification of the information printed on the marker. This size of counter adapts nicely to the 16mm hex and is a compromise between having extra space in the grid to allow for counter handling and wasted space (78:12). Bigger hexes mean less playing area and the designer must weigh the trade-offs carefully when departing from the standard 16mm hex (78:12). Some game designers have been going to 14mm hex grids to allow for more hexes on the map, and this still allows the use of the half inch counter.

Raw movement is defined as the ability of a given unit to move as far as possible in a certain length of time traveling on a prepared surface and unimpeded by weather, terrain, or other factors (78:12). It represents optimal conditions and gives the designer the base line for handling refined movement. Raw movement is a function of map scale, the turn scale and the unit's speed represented by the equation:

$$\frac{\text{Speed of Unit X Length of Turn}}{\text{Scale of Hex}} = \text{Number of hexes moved per turn}$$

In this formula the designer must set the speed of the unit in the same increments as the scale and the turn. Therefore, if the speed is kilometers per hour, then the

scale of the hex must be in kilometers (78:12). There are several general rules pertaining to movement allowances. First, an average unit should be able to move at least an average of four hexes per turn unaffected by weather, terrain, and the enemy (78:12). Any movement lower than this gives the opposing player too much advantage in "reaction time" (78:12). The second rule pertaining to movement is at the other end of the spectrum. If the average unit can move from one end of the map to the other in the same turn, then the movement is too high (78:12).

Central to the refined movement system of wargame design is the concept of "movement point costs per hex" (78:13). The movement allowance is printed on the counter. The cost or how much of the movement allowance is used when a unit enters a particular hex is determined by a separate table which is usually called a Terrain Effects Chart (78:15). The terrain effects chart summarizes the movement and combat effects of various types of terrain that are depicted on the map or gameboard.

The level of play and map scale also effect movement in a more indirect fashion via counter density (78:13). An operational level game will put about three times as many counters on the same map as a strategic level game (78:13). When faced with high counter density, the designer will need to make some adjustments for movement. One approach is to manipulate the zones of control (ZOC) as they affect movement. In older game designs the ZOC

stopped all movement and forced combat because it was assumed that a unit always exerted some influence outside of the hex it occupied. Depending upon the situation this may or may not be true. The ZOC might represent a cautionary brake on movement since troops tend to slow down when they approach an enemy or when they think they are close to the enemy (78:13). The game designer must determine the effect of the ZOC on the basis of the size of the unit or the number of counters in a stack in relation to the hex scale. Adjusting the effects of ZOCs is one way of injecting a great deal of realism into wargame design without complicated mechanics (78:13).

Another impact on refined movement is the tactical doctrine of the unit doing the movement (78:15). Throughout history, the available weapons have decided how troops would move and deploy for battle (78:15). Prior to gunpowder the weapons were effective only at close range hence the formations were compact. However, after the development of gunpowder the range between opposing forces lengthened, but the formations remained close. With the introduction of the machine gun and the refinement of artillery, formations began to loosen (78:15).

Another impact on refined movement is the status of a unit's supply source. If a supply train is lost or out of support range, movement is effected (78:16). With the introduction of gunpowder, the supply train became even more critical. A lack of ammunition will eventually halt

operations. Each soldier carries a basic load of ammunition, and this is usually expended in an engagement of any intensity (78:16). If there is no supply available, the units tend to avoid engagement and fight only when there is no other course of action (78:16). The effect of supply on movement in modern combat is pronounced because of the need for fuel for tanks and vehicles (78:16). Lack of supply also reflects a breakdown of cohesion within the unit, and this makes coordinated movement more difficult. Supply systems are designed into wargames through a variety of methods. In some games the supply train may be represented by a counter while in others it can be abstracted to a straight unimpeded line between combat forces and their source of supply (78:16). In other games the supply elements may be factored into the combat strength of units or the game may include special rules for supply for each scenario (78:16).

Mode is another recent concept in wargame design which has a direct impact on refined movement (78:17). Normal marches are in columns but forces can not effectively fight from this position and generally will shift to a line formation before engagement (78:17). In some system designs changing modes will be reflected as some movement point (time equivalent) costs (78:17). In these design systems road movement is permitted only when the unit is in column formation and, once the units are in a line mode their direction of movement is somewhat limited (78:17).

Hex capacity also has an effect on refined movement (78:17). The hex scale determines the number of units that can be supported within a particular area or hex. If an area is already occupied to capacity, then the introduction of a new unit will have some adverse effect on movement (78:17). If disintegration takes place, there is often a cost in movement (time) points while the affected units reform (78:17).

The weather has an effect on movement (78:17). In very bad weather, forces usually do not move and fight (78:17). Heavy rains and winter snows will tend to stop movement or to allow it to continue on a limited basis (78:17).

In advanced game designs there are a number of other factors that can influence refined movement (78:17). A better led unit will generally move faster than a poorly led unit. A unit with better communications will move faster and more efficiently than a unit with poor or no communications. A better trained unit will tend to move faster. A veteran unit will move faster than a green unit. A unit with high morale will move faster than a unit with low or poor moral. Generally, tired troops move much slower than fresh troops (fatigue factor). This is particularly true when dealing with infantry units (78:17).

Terrain. In wargames there is usually a great deal of simplification of terrain (78:14). In most cases the number of terrain types rarely exceeds a half-dozen: clear,

woods, rivers, towns, swamps and hills (78:14). When a small scale map is used (1:1,000,000) there is a fair correlation between the game map and the source map. However, when the level of play is operational or tactical and a large scale map is used (1:50,000) simplification of terrain creates some serious distortions. The larger the scale the more the differentiation of terrain required, and line of sight rules are usually complex (78:14). For example, if a game map has five different levels of elevation, then who can see whom and from where begins to get problematic (78:14). The situation gets even more complicated once trees and houses are added.

Military significant terrain is usually grouped into four categories: (78:14)

elevations: hills, slopes, mountains, cliffs, etc.

foliage: woods, forests, scrub, undergrowth, etc.

man-made: villages, towns, dwellings, cities, etc.

water: rivers, streams, lakes, swamps, bogs, etc.

Terrain has a direct impact on movement and combat. To determine the effects of terrain in a game, the designer needs to examine several factors. The first is the scale of the hexes (78:14). For example, a small thicket of woods 25 meters in diameter is important if the scale is 50 meters per hex, but if the scale is 50 kilometers per hex then the thicket is militarily insignificant (78:14). A

second factor deals with the density of the terrain feature (78:14). There is a difference between woods and forest. The former implies a looser stand of trees with less undergrowth while the latter gives the impression of a greater obstacle (78:14). The same is true of town and city, river and stream, etc. In general, the greater the density of the terrain feature the greater the effect on movement or combat (78:14).

Practically everything tends to inhibit movement except man-made tracks such as roads (78:14). Even relatively clear hexes impede movement to some degree although not as much as significant terrain features such as woods, depressions, etc. In most game designs clear hexes allow normal movement, and roads have a bonus movement which can be up to double the normal movement (78:15).

Terrain features have a significant impact on combat operations. Various types of terrain will hide forces making it easier for one side to ambush another (38:245). Many terrain features provide protection from enemy fire, and some slow down the momentum of an attack (38:246). Some types of terrain features will conceal forces from sight but not from the effects of modern weapons (38:246). For example, a forest can provide protection from enemy observation, but when hit with certain types of artillery fire it becomes more dangerous since the exploding shells create additional lethal wooden fragments (38:246). Some

terrain features provide mutual protection for both the defender and the attacking forces. A town would initially be advantageous to the defending force, however, once the attacker penetrated the town he is also covered from the effects of enemy fire and observation (38:246). Rivers, streams and similar bodies present a special case in combat operations. The attacker must first appear on the bank of the river and attempt to cross by building a bridge, using boats or finding a shallow area. During this time the defender has an excellent opportunity to kill a large portion of the attackers before they cross the body of water (38:246). The attacker in this scenario would need to use his artillery and long range fires to reduce the effects of the defender's fire (38:246). Fortifications also represent major obstacles for attacking forces (38:246).

In wargame designs the effects of terrain on combat generally improve the position of the defender (38:245). These effects are designed into the Combat Results Table (CRT) with the different types of terrain reducing the attacker's odds by moving one or two columns to the left on the CRT table (38:245).

Combat and Play Sequence. Depending upon the rules of the game and the period of battle, combat may either be voluntary or mandatory (48:194). Zones of control also effect combat and the movement of forces by preventing enemy units from retiring and locking them into position

until they are released by a combat result (48:194). In wargame designs combat results may take several forms. It can involve a straight elimination of one or both units, an exchange in which both sides suffer losses, or a retreat for one side (48:195). A recent trend in wargame design is to use step reductions by which forces gradually lose strength from various engagements (48:195). The step reduction is the most accurate method since, in reality, military units are rarely totally destroyed by combat engagements (48:195).

Pain, suffering and death are fundamental to combat, but they are nearly impossible to simulate accurately (78:18). Additionally, real combat is marked by confusion, ignorance, anxiety and simultaneous action (78:18). However, game designers attempt to simulate the effects of combat by results such as defender eliminated, attacker retreated, units disrupted, etc. Combat design begins with play sequence. The play sequence will let players know when to fight and when they cannot (78:18). The two essential parts of the play sequence are movement and combat (78:18). Many games also incorporate a fair amount of housekeeping-type phases at the beginning or end of a players turn. Such activities include: reinforcement appearance, production routines, and rally of broken units (78:18).

Various methods of play have been used by commercial companies. In some cases one side moves and then resolves

combat, and then the other side does the same (78:18). Other design systems have started with combat and then maneuver and then close combat (78:18). This manipulation of the playing sequence gives the impression of simultaneous action even though the mechanical routines are very distinct (78:18). Another system of play introduced by Simulations Publications, Inc. (SPI) was to maneuver, engage in combat and then maneuver the armored units (78:18). In these systems the impulses of a single phase were reserved to a single player which means that when player A is fighting or moving, player B cannot react. In tactical level games this caused some awkward situations, and the concept of "opportunity" fire was developed (78:18). Opportunity fire is controlled by the rules; but basically, it means that if the phasing player moved in a prescribed fashion, the non-phasing player would be allowed to fire (78:18).

The game designer must consider the effect the play sequences will have on the combat system (78:19). To determine this effect there are three considerations. First, an emphasis on fighting or movement will approximate the number of impulses in the play sequence. For example, a Fire (F), Maneuver (M), and Fire (F) system usually highlights the fighting whereas a Maneuver (M), Fire (F), Maneuver (M) system highlights movement (78:19). Second, a F, M sequence will create a much more fluid type of play than a M, F sequence (78:19). In a F, M sequence the

phasing player has the opportunity to first destroy the nonphasing player's units and then move before the other player has an opportunity to react (78:19). In a M, F sequence combat comes at the end of the phase and the opposing player gets to repair the damage (78:19). If the game theme calls for high density counters, a F, M sequence would loosen up a static game (78:19). On the other hand, a M, F sequence extends the reach of a unit's attack unless the rules do not allow units that moved to fight that turn (78:19). In current wargame designs a M, F sequence is used in operational and strategic level games while a F, M sequence is more common in tactical and subtactical level games (78:19). Interestingly, the M, F sequence at the strategic level tends to parallel historic accounts and a F, M sequence at the tactical level gives the appearance of simultaneous action (78:19). Third, if the game designer uses conditional fires (Fc) or conditional fighting where only certain units may fight, the movement of the game will slow down. Conditional fires cause detours, shorter moves, and double fires (78:19). A unit may get hit once with conditional fire and then again with regular fire.

In older designs the play sequence determined initiative with one side always pre-determined by game design to be the first player for each turn (78:19). In recent game designs the first player is now determined turn by turn depending upon the result of a die roll or by some other means (78:19). This variable initiative sequence

system comes in two forms; rigid and flexible (78:19). In the rigid form, the die roll determines who is the first phase player. In the flexible form, the die roll allows one player to choose whether he will be first or second (78:19).

Combat Strength and Resolution. Determining the combat strengths to place on the counters representing the various units is a less formidable task than it appears (78:20). A normal counter mix has strength values ranging from 1 to 15 (78:20). In general, values above 15 waste time and detract from the playability of the game since the math begins to get complicated. Additionally, the strongest unit is rarely more than 15 times as strong as the weakest unit (78:20). The game designer can use three time honored systems for determining the combat strengths of units: aggregation, analog, or guessing (78:20). The combat strengths only have meaning in relation to the Combat Results Table (CRT) (78:20). Therefore, the only validation needed is whether the numbers will work on the CRT. Any wrong results will be identified and corrected during playtesting (78:20).

The method of aggregation has an aura of precision (78:20). Using this method the game designer develops a value for each weapon in a unit and then totals the values to get the unit's strength (78:20). In establishing the value the designer would formulate some type of formula (i.e. bore X velocity or weight of round X rate of fire)

that would allow a common valuation (78:20). Then its a matter of adding up page after page of numbers to get a throw weight index (78:20).

The method of analog uses empirical data to rate the units inside of a 1-15 construct (78:20). The game designer begins by assigning the weakest unit a 1 or a 2 and the strongest unit a 15 or whatever the upper limit is (78:20). The remaining units are ranked in between based on their actual performance in offensive or defensive operations or on a researched assessment of their capabilities (78:20). The problem with the analog system is the assignment of values in the middle range; it is difficult to differentiate between a 6 and a 7. The analog designer makes a subjective call (78:20). Supporters of the method point out that analog determination works best in situations where the designer has a deep knowledge of the game's subject matter (78:20).

Guessing is one of the least reliable methods used, although some designers feel that the guess is an analog determination made by the subconscious (78:20). This method can only be used by designers who possess deep knowledge of his subject matter; "he doesn't know how he knows." (78:20).

The use of a probability table (the CRT) to resolve combat has been a part of commercial wargaming since its inception (78:21). The basic elements of the CRT have become fairly standardized; a comparison of strengths along

the top, a list of random number results down the side and the actual results of the combat in the middle of the matrix (78:21). Acceptance of the CRT stems from two very sound wargame design conventions (78:21). First, the attacker needs more than parity to accomplish any reasonably successful offensive action. Second, an increase in the attacker's superiority will result in a more than proportional increase in the defenders casualties. In other words a 6:1 attack ratio is a good deal more than twice as effective as a 3:1 attack ratio (78:21). Most CRTs use proportional odds with the attacker's strength compared to the defender's strength to obtain a proportion (i.e. 3:1, or 6:1) (78:22). Rounding of the odds is usually in favor of the defender (78:22). In some cases the bias in favor of the defender was too pronounced and the differential odds system was developed to compensate for this bias (78:22). This system of odds determination has the defender subtract his strength from the attackers (78:22). For example, an attacker/defender ratio of 13:7 under the proportion odds system would reduce to a 1:1, but under the differential odds system the ratio becomes a +6 and eliminates the rounding effect (78:22).

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VIII. Air Base Ground Defense Wargame

This chapter integrates much of the material presented in earlier chapters. As noted in Chapter 1 the purpose of this study was not to construct a wargame for use by ABGD forces but to identify many of the variables that would need to be modeled in such a wargame design. To accomplish the integration of this material, this chapter has two major subsections: Tactical Implications and Game Design Considerations. The Tactical Implications subsection is the product of an analysis of Chapters 3 through 5. In it, some of the tactical issues that will need to be incorporated into the wargame design to build a reliable degree of realism into the game are examined. The Game Design Considerations subsection is the product of an analysis of Chapters 6 and 7 and identifies many of the game design variables that will need to be addressed to actually construct the Air Base Ground Defense Wargame.

Tactical Implications

Threat Force Concept of Operations. The Soviet's doctrine and training prepares their forces for fast and decisive military action against their enemies. Their doctrine concentrates on mobility and high tempo of operations coupled with a simultaneous destruction of their enemy throughout the depth of his deployment. The Soviets

feel that their violent approach to war coupled with surprise will be responsible for a large degree of disintegration among the enemy's combat forces. The potential use of nuclear weapons on the modern battlefield only serves to reinforce to the Soviets their chosen way of war. The Soviets emphasize the importance of striking the enemy quickly and penetrating his defenses to destroy his nuclear capability before he can use them against Soviet forces. The Soviet method of war can be viewed as encompassing three distinct, yet related categories of operations. The first is their peacetime intelligence network that keeps them informed of significant activities pertaining to their potential adversaries. This means that Soviet forces will have been well prepared in advance for hostilities. Their strikes will be quick and accurate. This has the effect of increasing the lethality of their attacks. The second category of operations takes the form of attack on the enemy's rear areas. These attacks serve to destroy the support structure of their enemy's combat forces. The third is the attack upon the enemy's main forces in an attempt to destroy them as rapidly as possible. The first two categories of operations are designed to support the third. In preparation for these types of operations, Soviet commanders are taught not to expect replacements but to quickly reorganize their forces and continue the mission. For ABGD forces this means that a series of delaying actions may not cause Soviet forces to

abort their assigned missions. The implication is that the only way to stop their attack is to capture them or destroy them. Soviet military exercises have repeatedly demonstrated the importance they place on striking the enemy's rear area.

Types of Threat Forces. Of the Soviet landing operation forces identified in this study, there seems to be two types of forces that do not present a significant threat to air bases; Naval Infantry and Airmobile forces. Naval Infantry forces would only pose a threat to air bases along coastlines. Airmobile forces are mainly used to secure lightly defended or undefended objectives within 20 kilometers of the line of contact and to enhance the rate of march of the Soviet main forces. Although airmobile forces do not appear to present a large threat to air bases their employment should still be modeled in the game.

The forces that appear to pose the greatest threat to ABGD forces are the Spetsnaz and Airborne units. Spetsnaz units seem to be the most likely threat to air bases. These units are tasked to collect intelligence, to conduct sabotage missions and to conduct small scale assaults against air bases. These forces predominately operate in small groups of 5 to 12 personnel but can operate as platoons or company size forces against large targets such as air bases. The greatest potential threat to ABGD forces lies in the use of Airborne forces. Soviet exercises show that these forces are usually deployed in company to

regiment size forces and one of their key objectives is the seizure or destruction of enemy air bases. These forces are motorized and have the mobility needed to quickly close on their objective. A lot of emphasis is placed on rapid assembly and departure from their drop zones. Any of our air bases that store nuclear weapons should be considered a very likely target for a large scale attack. The game should model the various missions of the Spetsnaz and Airborne units. Additionally, the use of the Operational Maneuver Group (OMG) could pose some problems for ABGD forces at forward bases. The game should develop several scenarios incorporating the employment of motorized rifle and tank forces in the OMG role.

ABGD Operations. The ABGD forces will need to set up normal operations concentrating on the Close Defense Area and the Mobile Reserve Force. Their particular defensive actions would be to use a system of fixed fighting positions along the perimeter of the base and a series of security posts and patrols within the areas of the base that contain vital resources. The Army Military Police will assume the role of screening forces and will concentrate in the Main Defense Area. However, for purposes of this game these forces will need to be included in the order of battle. This will also serve to give SP personnel training in these areas in the event that they have to perform those missions until the Army or host nation can assume the role.

Game Design Considerations

Objectives. An Air Base Ground Defense Wargame should be designed and used to achieve a number of objectives. First, the game should be capable of reinforcing doctrinal and tactical concepts used to support current ABGD operations (59:1). Second, the game should be capable of verifying base defense plans for various bases whose terrain is depicted by the game map (59:1). Third, the game should be designed to reinforce players' knowledge pertaining to the range, lethality and capabilities of modern weapons. Fourth, the game should afford the players the opportunity to use and think about the terrain of their respective base from a tactical perspective. Fifth, the game should teach and reinforce the proper employment and lethality of suppressive type fires (MK-19 and M-60) and indirect fires (81mm mortars). Sixth, the game should help players develop an understanding of the complexities of conducting tactical operations. Lastly, the game should give players the opportunity to develop an understanding of the capabilities of the enemy's weapons and allow them to develop ways in which to minimize the effectiveness of those weapons.

Map Size The area to be represented by the game board should include the base proper and a majority of the terrain within 3 to 5 kilometers of the air base. However, the area to be represented on the game board should not be too large because the scale of the game would then make it

impossible to use small forces such as individuals or fire teams. The recommended space to be modeled in the game includes the air base and approximately 3 kilometers of terrain outside of the air base. This area is recommended because the modified operations for the DAD doctrine is to occupy terrain within 2 kilometers of the air base and use screening forces to dominate a reasonable distance from the MDA. This area on a 1:50,000 map would represent an 8,000 meter square area with the air base located in the middle. The actual size of this area would vary from base to base.

There are two approaches to establishing a map for the ABGD wargame. The method proposed by the Air Force Office of Security Police (AFOSP) is the development of a sectional type game board that would be set up on a permanent basis (59:4). The sections would be vinyl surfaced paperboard or similar material measuring 24" X 24" and overlaid with a hexagon grid system (59:4). These sections would allow bases to configure either 6' X 6' game boards or 8' X 8' game boards. Depicting 8,000 meters on the 6 foot square game board one 16mm hex would represent 69.99 meters per hex and the 14mm hex would represent 61.24 meters per hex. Depicting 8,000 meters on the 8 foot square game board one 16mm hex would represent 52.49 meters per hex and the 14mm hex would represent 45.93 meters per hex. This type of game board would require the various terrain features to be printed on vinyl strips with

adhering qualities to allow the game board to be set up in various configurations corresponding to the respective base (59:4).

There are a few problems with this type of game board system. Each Security Police unit having a need for the game will require sufficient amount of space to set up the game board on a permanent basis. Allowing a two foot margin on all sides for movement of the players and other personnel, the space required would be at least a 10 foot square area. Very few units have this much space to dedicate to a permanent wargame. This game board design would not permit the use of the umpired blind system. To introduce realism into the game, the players would have to use the hidden movement system and keep accurate records of the locations and movements of their respective forces until contact is made. However, in a tactical game of this nature there will be a lot of playing units and movement involved. The administrative burden of hidden play could prove to be too excessive. It would also drastically slow the pace of the game and cause players to loose interest.

The second approach to the game board design is to use a design similar to those of the commercial wargame industry. The map size would then be 36" X 36." This size of map would be convenient in that it would readily fit on any standard size table. For packaging and storage purposes the game boards could consist of three 12" X 36" game boards and using a trifold they could easily fold up

to a 12" square which would fit into a bookshelf style box for easier storage and safekeeping. An 8,000 meter area depicted on a 36" X 36" game map and using a standard 16mm hexagon grid overlay would yield a map scale of 139.98 meters per hex. By using a 14mm hexagon grid overlay the map scale would represent 122.48 meters per hex. The 16mm hex gives a little extra room for handling the standard half inch counter whereas the 14mm hex does not. However, in the final design the scale of the map may have a significant impact on the movement allowances and the size of the forces depicted so it may be necessary to use the 14mm hex grid.

The movement scale would have to be developed after the time scale of each turn is determined. Both of these systems are highly dependent upon the final scale of the map and each hex, as was examined in Chapter 7 of this study. Each type and size of force should have its own particular movement allowance based upon the scale distance that it can travel within the determined time scale. During the development of the game design, consideration should be given to breaking movement down into two types of travel: normal and tactical. Generally, tactical travel will be much slower than normal travel, but would strengthen the response and combat capability of a unit.

In addition to the movement scale another important element that needs to be used in this tactical level game is mode or the direction that units are facing or moving.

For example, if a single sentry is in a position and is facing one particular direction he may not be able to see or bring fire to bear on an enemy force in another direction. If he does spot the force then he has to change his body and weapon position to engage and this action requires some element of time. The amount of time and the delay that will be suffered as a result of changing modes will depend upon the time scale of the turns. Mode is also important when forces are moving and then have to engage in an assault or respond to an attack. These changes in mode will need to be represented as some type of movement point cost, particularly when dealing with larger formations.

Terrain Features. The terrain features that should be modeled on the game board involve the significant natural terrain found on and around the respective air base and other features that are normally found on air bases. The game should include terrain features from the four categories of terrain (see Chapter 7 of this study): elevations, foliage, man-made, and water. The natural terrain and other stationary features should be professionally pre-printed on the game boards. This would not only make the games visually attractive, enhancing interest, but also enable the various games depicting actual air bases to be distributed to different SP units. Therefore, stateside units tasked to deploy to overseas locations could pre-train with wargames of those locations

In addition to the natural terrain the following physical features of an air base should be represented on the game board:

1. Aircraft (59:2).
2. Aircraft shelters (59:2).
3. Aircraft parking aprons (59:2).
4. Antennas and microwave transmission points (59:2).
5. Base Defense Operations Center (BDOC) (59:2).
6. Chain link fencing (59:2).
7. Concrete defensive fighting positions (59:3).
8. Electrical power stations (59:2).
9. Hangars (59:2).
10. Housing areas (59:2).
11. Munition storage areas and igloos (59:2).
12. POL tanks and pumping stations (59:2).
13. Railroad tracks (59:2).
14. Runways and taxiways (59:2).
15. Sandbagged defensive fighting positions (59:3).
16. Water treatment plants (59:2).
17. Wing Operations Center/Command Post (59:2).

Order of Battle. The order of battle represents the the types of forces involved in the wargame and their respective weapons and equipment. In the ABGD wargame the

game pieces would need to reflect the following types of forces and equipment:

Types of ABGD Forces:

1. Listening/Observation Post (59:4).
2. Single SP, M-16 Armed (59:3).
3. M-60 machine gun crews (59:3).
4. 50 caliber machine gun crews
5. 90mm recoilless rifle crews
6. Military Working Dog (MWD) Teams (59:3)
7. SP fire team (59:3).
8. SP squad
9. SP flight
10. Flight Headquarters (59:3).
11. Squadron Headquarters (59:3).
12. Group Headquarters (59:3).
13. Fire Direction Control Center (FDC)
14. SP Supply Units
15. Army MP platoon (59:4).
16. Army MP company (59:4).

Types of Soviet Forces:

1. Terrorist (59:4).
2. Snipers
3. 2 man (agent) reconnaissance elements
4. 5 man (agent) sabotage team
5. Small partisan elements (4-6 personnel)
6. 5 man Spetsnaz force
7. Spetsnaz squad, platoons, and companies

8. Antiaircraft missile squads (31:4-134).
9. Airborne squads, platoons and companies
10. Airmobile squads, platoons and companies
11. Naval infantry squads, platoons, and companies
12. Motorized rifle squads, platoons and companies (31:4-22 to 23)
13. Tank sections, platoons, and companies (31:4-98).

Types of ABGD Weapons and Equipment:

1. M-16 rifle
2. M-60 machine gun
3. M-203 grenade launcher
4. MK-19 40mm automatic grenade launcher
5. 81mm mortars
6. 50 caliber machine guns
7. 90mm recoilless rifles
8. M-72A2 Light AntiArmor Weapon (LAAW) (59:3).
9. M18A1 claymore mines
10. Slap flares
11. Trip flares
12. Night vision goggles and devices (59:3).
13. M-151 jeep
14. Pick-up trucks (59:3).
15. 2 1/2 ton trucks (59:3).
16. HMMWV with mounted M-60 machine gun.

17. HMMWV with mounted MK-19 automatic
grenade launcher.

18. M-113 Armored Personnel Carrier (APC)

Types of Soviet Weapons and Equipment:

1. PM, 9mm pistol (31:4-134).
2. AKS-74, 5.45mm assault rifle (31:4-134).
3. RPKS-74, 5.45mm light machine gun
(31:4-134).
4. AGS-17, 30mm automatic grenade launcher
(31:4-134).
5. RPG-16D, Antitank Grenade Launcher
(31:4-134).
6. SA-7 Surface to air missile (31:4-134).
7. GRAIL surface-to-air missile (31:4-134).
8. SA-14 surface to air missile (31:4-134).
9. AT-3/Sagger, Antitank guided missile
(31:5-83).
10. RPG-7, Antitank grenade launcher (31:5-
73).
11. AK-47, assault Rifle (31:5-3).
12. BMD, Airborne Amphibious Infantry Combat
Vehicle (31:4-134).
13. BMP, Armored Amphibious Infantry Combat
Vehicle (31:4-134)
14. SVD, 7.62mm Sniper Rifle (31:4-22).
15. T-64, Medium Tank (31:4-98).
16. T-72, Medium Tank (31:4-98).

17. T-80, tank (31:4-98).
18. Mi-2/HOPLITE, Mi-4/HOUND and Mi-8/HIP C and E transport helicopters (31:5-174 to 177).
19. Mi-24/HIND attack helicopter (31:5-180).
20. Classified Weapons Indicator (59:4).

The game design should allow a breakdown of forces involved in the game. For example, a Soviet airborne company conducts a landing operation near the air base which is its objective. Real world tactical movement would have the force split into three platoons, each with their own respective routes of advance or axis to the objective area. Additionally, each platoon could break down into squads depending upon the scheme of attack for each platoon. Allowing the playing pieces to break down and reassemble is one way of adding realism to the wargame. However, in a related issue, once a force breaks down the sum of the strengths of its parts does not equal the strength of the whole. This means that the three separated platoons are not as strong as all of them when formed into a company size force. This relationship will need to be considered by the game designer if breakdown of forces is permitted in the final game.

Methods of Play. The game should be played in steps or levels. In level I play the objective would be to teach players how to play the game and allow them to get familiar

with some of the game mechanics. This level of the game would be relatively simple and have an emphasis on playability. It should be fun and fast paced so that the players will not loose interest in the wargame. This level could display all of the forces on the board in order to help beginners understand the mechanics of the game and to begin some basic teachings in tactical doctrine and operations.

The intermediate or level II play would introduce additional elements of realism into the game. This would slightly complicate the playability of the game. The emphasis of this level would be learning the principles of war and reinforcing tactical doctrine. The pace of the game would begin to slow down as the players begin to deal with more elements of reality. The game could be played in one of two ways. The players could either turn their markers over so as to hide the types and strengths of their forces or the players could play on separate game boards. The preferred method would be to use separate boards because this would serve to get players ready for the advanced version of the game.

The advanced or level III play would be extremely complicated and would be recommended for veteran players only. The emphasis of this level of play would be on the simulation of actual combat and would reinforce tactical concepts and doctrine learned in previous levels of play. This level would also permit a playtest of the base defense

plan. This game would be extremely advanced and very slow moving. The players would use separate boards. An umpire would monitor the game and all movements. During this level of play, the game board could also be divided into sectors and played with one player assigned to each sector.

Simulation of Combat. The combat results should be based on a system of step reductions in combat strength which would represent the effects of casualties on combat operations. The impact of these casualties could possibly effect troop morale and this would need to be factored into the reduced level of combat strength. The use of chemical munitions needs to be modeled into the game and a reduced combat strength given to units involved in chemical operations. Explosive indicators will need to be used to plot the locations of blast from weapons such as grenade launchers and the 81mm mortars. The amount of damage that is inflicted by these rounds would be determined by the roll of a die and consulting a Blast Damage Chart.

Detection Probability. To inject realism into the wargame, the possibility or chance of detecting opposing forces will need to be modeled in the game. Due to terrain features and/or distances involved, opposing forces may move in close proximity to each other but not detect one another. Therefore, whether one force discovers another and reacts to that discovery introduces the element of probability in the detection capability of all forces in the game. A Detection Probability Chart will need to be

developed. For example, when a Soviet patrol is approaching a position the umpire, without the knowledge of either player, would role a die to see if the enemy force spots the position or if the position spots the enemy unit. The Detection Probability Chart should include detection capabilities from both sight and sound. The line of sight rules and visual detection would be determined by the scale of the game.

Night Combat Operations. The game should also model combat at night. During these operations the probability of detection would be much lower. This scenario should incorporate into ABGD operations the use of trip flares, slap flares and 81mm mortar illumination rounds. The use of illumination devices requires the development of Illumination Points which would correspond to the duration and intensity of the respective round of illumination. These illumination points would be used in conjunction with the Detection Probability Chart to increase the probability of detection to slightly lower than daylight levels within the radius of the lighted area.

Temporary Disintegration. Another element of combat that would need to be simulated in the ABGD wargame is the temporary disintegration of a unit. This condition exists during the splitting of forces and during various combat actions that increase the level of confusion inherent in combat operations. This condition will need to be handled by the development of a Disintegration Chart which

would tell the players how bad the disintegration is and how long it will last. The disintegration would have an effect on the unit's ability to move and should result in a movement point cost. Disintegration also effects a unit's combat capability and should result in a temporary reduction of combat strength. The disintegration would be more pronounced if the unit was moving under stress such as the case of an ABGD squad responding to an attack in one of the sectors or an enemy reconnaissance patrol that runs when it is detected or fired upon. Additionally, larger units are more susceptible to disintegration than smaller units. With the use of a Disintegration Chart, a roll of the die would determine if any disintegration has occurred and its severity.

Zone of Controls. One element of a combat system that is central to most wargames depicting modern combat is the zone of control (ZOC). The game scale and the type of forces that are modeled will have a significant impact on the ZOC rules. A single SP with an M-16 rifle should be able to influence a significant area within his line of sight because the M-16 has a maximum effective range of 460 meters. The hex scale on the proposed map represents approximately 140 meters. The ability of an average individual to successfully engage a target with an M-16 rifle reduces to a more realistic figure of approximately 200 to 300 meters. A rifleman may have an influence over the hex that he is occupying plus one additional hex for a

total distance of 280 meters. The rifleman would be in a fighting position with his field of view and fire relatively limited. He could not turn and fire behind him or to the side because he may fire into friendly troops. Therefore, a single individual would only be capable of having a ZOC in the hex to his immediate front. In a tactical wargame where the position of forces can determine their direction of fire, the mode or the direction the unit is facing becomes an important issue.

Squad travel would take up an entire hex depending upon the type of movement being used by the squad. Fire teams generally travel in a wedge formation with approximately 10 meters between individuals (24:3-11). During this movement a fire team will normally occupy a 20 X 20 meter area. A squad would use one of three traveling methods: traveling, traveling overwatch, or bounding overwatch (24:3-13). The traveling overwatch formation is used when enemy contact is not likely and involves a distance of approximately 20 meters between fire teams (24:3-13). Using this movement technique a three fire team squad would cover approximately a 20 X 100 meter area. The traveling overwatch formation is used when enemy contact is possible and requires the second fire team to trail behind the lead team by approximately 50 meters and the third fire team 20 meters behind the second (24:3-13). A squad using this movement formation would occupy a 20 X 130 meter area. The bounding overwatch movement formation is used

when enemy contact is expected and involves one fire team providing an overwatch element while another fire team moves forward (24:3-14). The lengths of the bounds depend upon the terrain but should never exceed 150 meters (24:3-14). The third fire team in this movement formation remains approximately 20 meters behind the overwatching element in a reserve capacity. A squad using this formation could cover an area between 50 X 50 to 50 X 100 meters, depending upon the terrain. Using the scale of one hex is equal to approximately 140 meters and modeling the use of these types of movement formations a squad size force would be able to exert influence in its own hex plus the six adjacent hexes. However, a tactical level game such as this will have a large number of counters on the game board and the effect of ZOCs on movement and combat needs to be considered very carefully by the game designer. Other factors which may have an impact on the ZOC issue are the density of terrain features and line of sight rules.

Summary

While this chapter has not defined all of the variables which must be incorporated into an ABGD wargame, it has identified those that must be included to properly simulate the ABGD combat mission. This chapter demonstrates that modern combat will be extremely violent, fluid, and lethal. These vital characteristics of combat

are difficult to simulate and doing so requires complicated game design systems. While the greatest benefits come from the most realistically designed games, one important element must not be overlooked; the players. The game should be designed in a building block approach so as to generate interest and enthusiasm rather than be too complicated and cause beginners to loose interest.

The results of this chapter are summarized in Tables 2 through 5. Table 2 summarizes the potential combat environment that ABGD forces may have to operate in during any future conflict. These elements certainly will have to be built into any wargame design depicting ABGD operations. Table 3 summarizes the objectives that an ABGD wargame should achieve and it briefly describes the levels of play and lists the combat simulation systems that will need to be included in the game design. Table 4 summarizes the listings of the required charts and special rules to guide the movement and combat of the units in the game. Table 5 summarizes the various map sizes and their respective hex scales.

Table 2. Potential Combat Environment

Soviet Operations

Aggressive Assault

Violent Action

Surprise

High Tempo

Strike Quick

Accurate Strikes

Vital Targets

Multiple Forces

Multiple Attacks

ABGD Operations

Aggressive Defense

All-Around Defense

Dominate Key Terrain

Fighting Positions

Active Patrolling

Mobile Reserve

Defense In Depth

Army MPs

Dog Teams (MWD)

Table 3. ABGD Wargame Summary

Objectives

- Reinforce Doctrine and Tactical Concepts
- Verify Base Defense Plans
- Reinforce Knowledge of Weapons Capabilities
- Think About Terrain Tactically
- Learn Employment of Suppressive and Indirect Fires
- Learn Complexities of Tactical Operations
- Understand Enemy's Weapons

Levels of Play

- Level I - Little Realism, Playability
- Level II - More Realism, Teach Tactics
- Level III - Maximum Realism, Simulate Combat

Combat Simulation Design Systems

- Step Reductions in Combat Strengths
- Chemical Operations
- Explosive Indicators
- Night Combat Operations
- Temporary Disintegration of Units
- Zone of Controls

Table 4. ABGD Wargame Combat Control Charts and Rules

- Blast Damage Chart
- Detection Probability Chart
- Disintegration Chart
- Chemical Operations Chart
- Line of Sight Rules
- Visual Detection Rules
- Illumination Points
- Terrain Effects Chart
- Combat Results Tables

Table 5. Map Size and Hex Scale

Map	Distance	16mm Hex	14mm Hex
<u>Size</u>	<u>Represented</u>	<u>Scale</u>	<u>Scale</u>
6' X 6'	8,000 sq m	69.99 m	61.24 m
8' X 8"	8,000 sq m	52.49 m	45.93 m
36" X 36"	8,000 sq m	139.98 m	122.48 m

IX. Conclusions and Recommendations

Conclusions

This study examined the concept of a board wargame that might be used by the Security Police (SP) as a training device for its air base ground defense (ABGD) forces. It began with an analysis of Soviet and US operational doctrine and tactical concepts to examine the potential future combat environment in which ABGD forces may have to operate. This analysis provides a potential game designer with basic knowledge he must have about the nature and lethality of modern combat. To develop a wargame that will realistically simulate combat, the game designer must understand how forces on each side will move, how they will attack, how they will defend, how and why they select military targets, and the philosophies of war which guide their tactical operations.

This study also examined the nature and composition of wargames. Components of wargames and game design systems were reviewed to determine those that need to be included in a successful game design. A historical examination of wargames determined that wargames have been successfully used in the past for training and testing of operational plans.

The third phase of this study integrated the two previous areas. This analysis identified tactical

implications pertaining to the types of threat forces and their associated tactics that ABGD forces may be facing in a future conflict. It also identified game design considerations that would inject reality into the simulation device.

This study concluded that a wargame can be an effective training device if designed properly. The first step in a successful game development process is identification of the proper variables in the combat environment to be simulated. These variables must then be translated into game design language which will yield the required effects to simulate modern combat. This part of the process includes all the considerations which ensure the game is played properly and is interesting to the players. The more realism depicted in a game, the more complex the game is. The balance between warfighting realism and game playability is crucial. If personnel are not allowed an opportunity to play wargames at various levels of complexity, they will lose interest. A successful wargame can be a tool for obtaining insights. Its developers, however, must carefully observe the guidelines outlined in this study to maximize its utility.

Recommendations

As a result of this study the following recommendations are made:

1. The eight wargames reviewed in Appendix C

should be studied and evaluated to identify the various game systems that should be extracted for application in the development of an ABGD wargame. Each game should be played extensively as a part of the study.

2. This study briefly examined the training benefits of wargames. However, further study should focus entirely on the issue of the training benefits to be derived from the use of wargames. Part of this study should contain an extensive review of the "dis-training" and "transfer of training" issues.

3. The Air Force Office of Security Police (AFOSP) should use this study to begin the development of an ABGD wargame. There are a number of recommendations included in the text of this study that will enhance the wargame system design and make it applicable to ABGD combat operations.

4. If an ABGD wargame is developed and implemented by AFOSP, it should be used as a supplement to a complete training program. It should not be viewed as a stand-alone training technique. The tactical concepts and lessons learned through the play of the game should be reinforced through tactical maneuvers and local ABGD training exercises.

Appendix A: Military Definitions

The following military terms are used in this study and are defined as follows:

1. Airborne Operations - These are tactical operations which are characterized by the movement and delivery of combat forces by air into a designated objective area (32:217).
2. Air Force Office of Security Police (AFOSP) - This is a Separate Operating Agency (SOA) under the Air Force Inspector General which develops policy for and plans, directs and supervises activities of the Air Force Security Police career field (1:129).
3. Airmobile Operations - These are tactical operations which are characterized by the movement and delivery of combat forces by helicopters into a designated objective area (32:217).
4. Avenues of Approach - These are routes which a force uses to reach an objective or key terrain feature (32:220).
5. Axis - This indicates the general direction of movement or advance of an attacking force and is assigned for control purposes (32:221).
6. Base - This is a position occupied by one or more units and has a defined perimeter (27:Glossary-1).

7. Base Cluster - This is a grouping of bases containing combat support and combat service support units which does not have a defined perimeter (27:Glossary-1).

8. Base Defense Force - This refers to the personnel who are tasked to organize, prepare, and conduct the defense of a base (27:Glossary-1).

9. Base of Fire - These are elements who provide suppression fire for the movement of maneuvering forces (32:221).

10. Blocking Force - This is the use of a military force to impede, stop, or hinder the advance of enemy troops into a particular area or against a friendly force (32:222).

11. Bound - This refers to a single movement made by troops from one covered position to another while under the protection of small arms fire from a supporting element (32:222).

12. By-pass - This action involves the avoidance of offensive combat with an enemy force so as to avoid the dissipation or diversion of combat power from the assigned mission (32:222).

13. Camouflage - This involves the use of natural or man-made materials to disguise personnel and/or equipment in an attempt to conceal their identity and location from enemy forces (2:115).

14. Canalize - This involves the use of natural or man-made obstacles and/or the use of weapons fire to restrict movement of enemy forces into a narrow zone (32:222).

15. Close Combat - This involves combat at close quarters to include the use of bayonets and hand-to-hand fighting (32:223).

16. Close With The Enemy - This refers to the movement of forces from the point where contact is made with the enemy to the positions occupied by the enemy (27:Glossary-1).

17. Combined Arms - This involves the use of more than one combat arms of the Army used together in combat operations such as the combined use of tanks, infantry, cavalry and artillery forces (32:224).

18. Command - This refers to the authority that a commander in the military services exercises over his subordinates by virtue of his rank and assignment (32:225).

19. Command and Control - This refers to the obtaining, processing, and dissemination of information by the commander in planning, directing, coordinating, and controlling military operations (32:225).

20. Concealment - These are measures that provide protection from enemy observation only (32:225).

21. Contain - This refers to combat actions designed to stop, hold or surround an enemy force and

prevent him from withdrawing any part of his force for use elsewhere (32:225).

22. Conventional Forces - This refers to forces who are capable of conducting operations with nonnuclear weapons (32:225).

23. Coordinated Attack - This refers to a type of offensive operation which employs a deliberate attack planned in detail and is normally conducted after thorough reconnaissance of the objective area (32:225).

24. Counterattack - This is an attack by a defending force against an attacking enemy designed to recapture lost terrain or to cut off and destroy enemy advance units (32:225).

25. Cover - This refers to any material, natural or man-made, which provides protection from enemy hostile fire (32:225).

26. Covering Fire - This refers to the use of small arms fire to protect troops within range (normally while they move from one position to another) (32:226).

27. Critical Point - This is any point along a route where any restriction of traffic flow could cause a disruption such as intersections, steep grades and bridges (27:Glossary-1).

28. Dead Space - This is an area within the range of small arms fire that cannot be covered by fire or observation from a particular position because of

intervening obstacles or the nature of the ground (i.e. depressions, ditches, etc.) (32:227).

29. Deception - This involves measures to mislead the enemy so as to induce a response which will place his forces in a position of disadvantage with respect to friendly forces (32:227).

30. Decisive Engagement - This refers to a level of combat in which a unit loses its freedom of action with regard to the accomplishment of its assigned mission (32:227).

31. Delaying Action - This is a type of retrograde operation in which friendly forces trade space for time; i.e. time for reinforcements to arrive, time for forces to concentrate elsewhere or time for other forces to withdraw. It involves the use of successive positions to inflict the maximum punishment on the enemy without becoming decisively engaged (32:228).

32. Demonstration - This is an attack or show of force on a front where a decision is not sought and it is conducted with the aim of deceiving the enemy (32:228).

33. Direct Fire - This refers to fire on targets which units can see (38:71; 42:11). Usually restricted to small arms fire.

34. Disengaging Action - This is a voluntary withdrawal of troops involved in a critical situation by breaking contact with enemy forces (32:229).

35. Drop Zone (DZ) - This is a specified area upon which airborne forces, equipment and supplies are dropped by parachute (32:229).

36. Envelopment - This is a type of offensive operation which involves the maneuver of forces whose main attack is directed against the flanks and rear of the enemy force (32:230).

37. Exercise - This is an operational training situation that attempts to realistically emulate conflict while being conducted as safely possible. The training situations are designed to sharpen the combat skills of military forces by placing them in a simulated hostile environment.

38. Exploitation - This is an offensive operation which takes advantage of the success of the initial attack against an enemy's position (32:231).

39. Feint - This is a show of force intended to mislead the enemy. It usually involves a shallow, limited objective attack by a small portion of the total force (32:231).

40. Field of Fire - This refers to the area in which a weapon or a group of weapons can effectively deliver fire from a particular position (32:231).

41. Final Protective Line (FPL) - This is a line where an enemy's attack will be checked with all available weapons deployed with interlocking fields of fire (32:231).

42. Fire and Maneuver - This is a method of attack in which one element attacks the enemy force while another element provides supporting fire. The purpose of the supporting fire is to fix the enemy force in place and suppress the enemy's fire to enable the attacking element to close with and destroy the enemy force (32:231).

43. Firepower - This is the capability of a military force to deliver fire (32:231).

44. Fire Team - This is a basic Air Force Security Police element which consist of four individuals and is led by a fire team leader. The fire team is usually armed in the following manner: two personnel carry M-16 rifles, one individual carries an M-203 grenade launcher (attached to an M-16 rifle), and the other is armed with either an M-16 rifle, an M-60 machine gun, or an MK-19 automatic grenade launcher depending upon his assignment within the squad (19:13).

45. Fix - This refers to actions taken to prevent the enemy from withdrawing any part of his force from one area for use in another (32:232).

46. Forward Edge of the Battle Area (FEBA) - This is the foremost limits of a series of areas in which ground combat units are deployed excluding the areas used by covering or screening forces (32:232).

47. Hull Down - This is the positioning of a tank or other mechanized vehicle behind a ridge crest, small

hill or improved defensive position which allows only the turrent to be visible to enemy forces (42:12).

48. Indirect Fire - This entails fire from weapons that can not directly see their targets such as mortars and artillery (38:73). These weapons rely on forward observers to call for and adjust their fire.

49. Interdict - These are fires that interrupt the enemy's lines of communication and supply behind the front lines (38:73). The main objective of interdiction fire is to harass and impede the movement rather than to destroy enemy forces (42:12).

50. Key Terrain - This refers to any location or area whose seizure and control affords a significant advantage to either combatant (32:236).

51. Logistics - This refers to an integrated system which involves the processes of acquiring, transporting, distributing and maintaining supplies and equipment needed to sustain combat power of combat forces (2:6).

52. Main Attack - This is the principle effort of an attack which the commander throws the full weight of his combat power and it is usually aimed at the chief objective of the campaign or battle (32:236).

53. Maneuver - This is a movement designed to place combat units in a more advantageous position with respect to the enemy force (32:237).

54. Mass - This refers to the concentration of combat power (32:237).

55. Meeting Engagement - This is a combat action that occurs between two moving forces who are incompletely deployed for battle (32:237).

56. Mobile Reserves - These are troops that are held back in favorable positions to be used as reinforcements or as counterattack forces (32:237).

57. Organic - This term refers to anything that is directly assigned to and forms an essential part of a military organization (32:239).

58. Penetration - This is a form of offensive maneuver which seeks to breakthrough an enemy's defensive position, widen the gap created and destroy the continuity of the enemy's position (32:240).

59. Physical Security - This refers to physical measures designed to safeguard and protect personnel, equipment, facilities, and combat resources against espionage, sabotage, damage, and theft (32:240).

60. Pursuit - This is an offensive operation directed against a retreating force and it occurs when the enemy attempts to disengage (32:241).

61. Rear Area Protection - This refers to the actions taken to protect rear areas from enemy operations and to prevent or minimize damage caused by enemy action (27:Glossary-2).

62. Reconnaissance - This is a mission that is undertaken with the basic aim of obtaining information

through visual observation or other detection methods (32:241).

63. Retirement - This is a type of retrograde operation in which a force not in contact with enemy forces begins an orderly withdrawal of its troops (32:242).

64. Retrograde Operations - This refers to any operation which involves the movement of a unit or force to the rear or away from the enemy (32:242).

65. Scheme of Maneuver - This refers to the tactical plans to be executed by a force in order to seize assigned objectives (32:243).

66. Security Police - This term identifies the Air Force career specialty which is responsible for providing forces to perform the security, corrections, law enforcement, and air base ground defense missions for Air Force Installations (22:2-2 to 2-3).

67. Squad - This is an Air Force Security Police element which consist of 13 personnel and is organized into three four person fire teams and a squad leader. One of the three fire teams has an organic M-60 machine gun (19:13).

68. Stragglers - This refers to military personnel within a combat zone that are away from their assigned unit without proper authority (32:245).

69. Target Reference Points (TRP) - This is an easily recognizable point on the ground (either natural or

man-made) which is used for identifying enemy targets or controlling direct and indirect fires (19:71).

70. Tactics - This refers to the employment of units in combat and describes the way in which physical force will be applied to the battlefield to seize or destroy assigned objectives (32:246).

71. Turning Movement - This is an envelopment operation in which the main attack passes around the enemy force to strike at a vital objective in the hostile rear (32:247). The enveloping force seeks to avoid an engagement with the enemy force while enroute to a position from which to launch an attack against its objective (32:247).

72. Withdrawal - This is a retrograde operation in which all or a part of a force in contact disengages from the enemy (32:248). A withdrawal can be conducted under three conditions: while not under enemy pressure, through a rearward friendly position, and while under enemy pressure (32:248).

Appendix B: Wargame Terminology

In addition to using standard military terms and language (Appendix A), the hobby of wargaming also has its own vocabulary of unique terms and phrases. This appendix defines many of the most commonly used terms.

1. Advance After Combat - If the results of an attack cause a defending unit to retreat from his position, one of the attacking units may move forward to occupy the empty hexagon or grid (38:61).

2. Air Range - This is the number of spaces on the gameboard that air units are permitted to move during their movement phase. These units usually have a higher movement allowance than ground units and are not hindered by terrain features as are ground units (38:62).

3. Area Map - This refers to a game board that does not have a hexagon grid overlay. Instead the game board is divided into areas which regulate movement and combat (42:11).

4. Attrition - This term refers to the gradual loss of a unit's combat power or capability rather than a complete loss of the unit (38:63). It is depicted in a war game by a number of methods. One method is to use a number of counters for the same unit with various strengths printed on each (38:63). Another method is to place

numbered playing pieces reflecting the current strength of the unit underneath the unit's playing piece (38:63).

5. Backprinted Counters - These are playing pieces or counters that have information pertaining to the military unit printed on each side of the piece (42:11).

6. Blast Radius and Strength - This is the area of a game board that is effected by the impact of artillery rounds, aircraft bombs, etc. It is represented by a circular pattern of hexagon grids from the center of the hexagon where the round exploded (38:64). The strength of the blast is the numerical rating of the effect of the blast and its effect lessens with incremental distances from the center of the blast (38:64-65).

7. "Bloody" CRT - This is a combat results table (defined below) which frequently results in the elimination of engaged units (42:11).

8. Breakdown - This is a method during play (depending upon the rules of the game) which allows a player to replace a single playing piece representing a larger force with several pieces representing the smaller subordinate units of that force (42:11). For example, a playing piece representing a battalion size force could be replaced with three playing pieces each representing a company size force. However, the total strength of the smaller units usually do not equal the combined strength of the original larger unit (38:65).

9. Case - This is a numbered (or sometimes lettered) paragraph which states or explains a specific game rule (38:65).

10. Chrome - These are rules that are added to a particular game in order to reflect individual peculiarities of a particular battle or to add realism to a particular game (42:11).

11. Clean game - This is a game which is simple and uncluttered with a high degree of playability versus realism (42:11). The game could possibly have some chrome but the system, rules, and physical components are not hard to understand (42:11).

12. Close Assault - This term is used in tactical level games and mainly refers to attacks involving hand-to-hand fighting (38:66).

13. Combat Phase - This is the portion of a player's turn during which his units attack the units of his opponent (42:11; 38:67).

14. Combat Results Table (CRT) - This is a probability table which is used to determine the results of combat after an attack (42:11; 38:67). The use of this table involves cross indexing the attacker's strength advantage with the roll of a die to find the results of the combat action for both sides (42:11). In reality the results of combat are unknown and the roll of the die introduces the element of chance into the combat action adding a degree of realism to the engagement (38:67).

15. Combat Strength - This is the inherent combat ability and effectiveness of a military unit which is expressed as a number on the front of the game piece and represents a strength relative to the other units used in the game (42:11). Some units may have two numbers indicating combat strength with the first one representing attacking strength and the second one representing defensive strength (38:66).

16. Command Control - This represents the ability of a unit on the game board to communicate with and receive orders from its higher headquarters (42:11). In some games if a unit is out of command control their movement and combat abilities are impaired. This represents the loss of a commander's ability to communicate with and control his subordinate units (38:69-70).

17. Consolidate - A player may combine several smaller units into a large one and the strength of the larger force will be greater than the sum of the smaller units (38:70).

18. Controlled Hex - This is a hex on the game board upon which a unit has the ability to project an influence such as in the case of a Zone of Control (defined below) (38:70).

19. Counter - This is another name for the playing pieces (38:70).

20. Covering Terrain - This is terrain on the game board which provides concealment from enemy observation and/or protection from enemy fire (38:70).

21. Dead Pile - This is a holding area for eliminated playing pieces (42:11).

22. Decimal Die - This is a die that has either ten or twenty sides and is used to generate random numbers from one to ten (42:11).

23. Double blind - This is a method of play in which each player has a separate copy of the playing map or game board and the combat units have to actively seek each other out (42:11).

24. Dummy Unit - These are blank game markers that do not have any unit markings on them (42:12). They are used in games where the units are placed face down so that the strengths of the units are not known until they are tried in combat (38:71). These units are used to provide deception and limited intelligence to the game.

25. Entry Cost - This is the movement point cost to enter a particular type of hex (38:71). These costs slow movement in areas other than roadways or other straight and level clearings.

26. Facing - This refers to the orientation of a unit within a hex (42:12). In some tactical games there are distinctions between front and flank and the direction of the unit is important since movement point costs are associated with shifting a tactical unit (38:71).

27. Fort (or Fortification) - This is usually a location printed on the game board (or represented by another counter) which indicates a well prepared defensive

emplacement and it will usually increase the strength of the defending unit (38:72).

28. Hex, Hexagon - This is a six sided polygon which forms the grid on most game boards (42:12). In most games, each hex is assigned a four digit number which assists in the playability of the game (38:72).

29. Hex Grain - This simply refers to the straight row of hexes (78:12).

30. Isolated - This is a condition in which a player finds one or more of his units cut off from all friendly forces by being surrounded by enemy units and/or impassable terrain (42:12).

31. Limited Intelligence - This is a condition during a game in which each player receives only a limited amount of information about the enemy forces (42:12).

32. Line Of Sight (LOS) - In a tactical game this is a condition in which there is a straight line between a player's unit and an enemy force which is unobstructed by terrain features (42:12). This condition is necessary in order to engage enemy units with direct fire weapons.

33. Mechanized Unit - These are units that are characterized by tracked vehicles such as armored personnel carriers (APCs), tanks and half-track vehicles (42:12). (Trucks and other vehicles such as the Soviet's BMD are referred to as motorized units).

34. Mechanized Movement - This is a movement phase during a turn of play in which only mechanized or tracked units can move (42:12).

35. Melee - This refers to combat at close quarters such as hand-to-hand fighting (38:73; 42:12).

36. Movement Point - This is the numerical expression of a unit's ability to move and is influenced by the type of terrain that the unit is moving through (38:73; 42:12).

37. Order of Battle - This refers to the make up of forces that each player has available (38:73; 42:12).

38. Overrun - This is an overwhelming attack by a superior force which results in the destruction of a defending unit (42:12).

39. Phase - This is the portion of a player's turn in which particular activities are allowed to happen (42:12). For example, movement phase, mechanized phase, combat phase, etc.

40. Phasing Player - The player currently taking his/her turn (42:12).

41. Production Center - This is a unit or facility on the game board that produces new units or supplies to be used in the game (38:74).

42. Programmed Instruction - This is a series of playing scenarios in which the rules become more complex as new rules are added (42:12).

43. Range Allowance - This is the number of hexes on the game board in which an air unit such as artillery or

missile forces can project their power in any direction.
(38:74).

44. Reinforcements - These are units that do not start the game but appear on the game board while the game is under play (38:74). The appearance and use of these units are often controlled by the rules of the game.

45. Replacements - These are not separate units but represent forces that are added to existing units to realize their combat strength (38:74). The use of replacements is controlled by the rules of the game, and such use is often based on the achievement of a particular number of replacement points.

46. Retreat Priority - As a result of combat action when a player must retreat one of his units, he can not move it along any path he chooses. Instead he must retreat the unit as a commanding officer would and this is referred to as the retreat priority (42:12). These actions are usually described in the rules of the game (42:12).

47. Road Movement Rate - This is the number of hexes that a unit can move along a road during the movement phase (38:74).

48. Scenario - This is a set of instructions for playing a particular game situation or event (battle) (42:12). It usually involves a description of the situation, starting positions of units involved, reinforcements that can be used and other special rules for the particular situation (38:75).

49. Sequence of Play - This is the order in which the phases occur within each player's turn (42:12).

50. Stacks - This is a group of friendly units occupying the same hex (38:76). The number of units that can occupy the same hex, if it is allowed at all, is usually limited by the rules of the game (38:76).

51. Step Reduction - This is the reduction of a unit's combat strength due to combat losses and involves the replacing of a unit marker with one representing reduced strength (42:13).

52. Supply - These are the consumable items used by a unit during movement and combat such as gas, food, ammunition, etc. (38:76-77).

53. Table of Organization and Equipment (TO&E) - This is a diagram that shows the organizational structure of military units to include the types of weapons and other equipment that it possesses (42:13).

54. Terrain Effects Chart - This is a chart which summarizes the effects of the different types of terrain on the movement and combat of units involved in the game (42:13).

55. Unit - This is a playing piece (usually cardboard) which represents various military units from a single individual to a Corps or an entire Army (42:13).

56. Untried Units - These units represent untested soldiers and they are placed face down on the game board

during play (42:13). Their actual strength is not revealed (or turned over) until they are engaged in combat.

57. Victory Conditions - These are the stated objectives which each player in the game must accomplish to win (42:13; 38:81).

58. Zone of Control (ZOC) - In most games this area involves the six adjacent hexes to the hex that a unit is currently occupying and it represents board space that the unit can immediately influence through the use of their organic weapons (42:13). In most games when a unit moves into an enemy's zone of control that unit must stop its movement.

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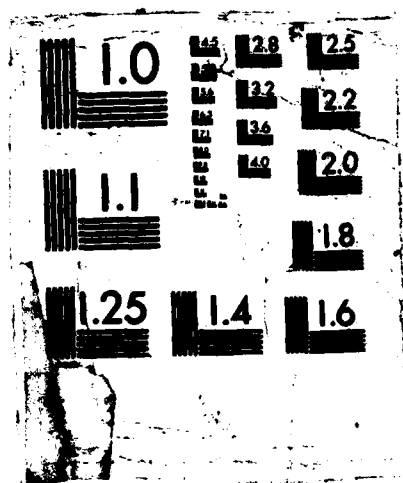
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Appendix C: Selected Wargames For Review

The following commercial wargames have been selected for review due to their possible value to those using this study. These games were selected for review for a number of reasons. First, all of them deal with modern weapons and involve US and Soviet forces. Second, most of them are tactical level games depicting forces of the size that will need to be modeled in the Security Police Air Base Ground Defense (ABGD) Wargame. These games need to be further studied in order to understand the way the game designers handled the combat operations of the Soviet forces. This analysis could also identify particular system designs that need to be incorporated into the ABGD Wargame.

1. AirLand Battle - This game is published by Omega Games and is advertised as being a realistic, detailed analysis of the US Army's current operational doctrine (70:1). The game allows players to command Army corps or Soviet armies in a European scenario. AirLand Battle is advertised as featuring rules that cover all aspects of modern integrated warfare to include armor, mechanized infantry, light infantry, armored cavalry, artillery, attack helicopters, chemical weapons, close air support, interdiction missions, MLRS rocket launcher systems, air

defense systems, and tactical formations (70:1). The game features a detailed step reduction of combat strength (70:1).

2. Cityfight - This game was published by Simulations Publications, Inc. (SPI) in 1980 and is a two player game representing urban combat from World War II to the near present (68:104). The game is complex with a rating of 7.0 on the complexity scale (68:104). Cityfight is played on two identical 17" by 22" map sheets representing a small West German city. The maps use hexes (representing 16.67 meters) and megahexes (center hex and surrounding six hexes representing a total of 50 meters) for command and control (68:104). The game has buildings made of wood, stone, or concrete and range in height from one story to eight stories (68:104). The game maps also depict bridges, woods and parks. The unit counters in the game represent individual vehicles, weapon systems, leaders, and snipers. The personnel counters represent four man fire teams, two and three man machine gun teams, and two man sapper teams (68:104). This game may serve as the basis for the urban combat systems that may need to be modeled in the ABGD wargame.

3. Firefight - This game was published in 1976 by Simulations Publications, Inc. (SPI) under an Army contract to depict modern combat (68:105). The game was designed to support three objectives for Army personnel: depict the range and lethality of modern weapons; give the players the

opportunity to use terrain, suppressive fires, and learn weapon's capabilities; and to simulate the combined arms team (68:106). Firefight is a two player game played on two 22" by 34" maps with hexes (representing 50 meters each) controlling movement and combat (68:106). The maps provide nine types of terrain features: clear, forest, streams, contours, bridges, towns, roads, trails, and defilade (68:106). The game is played with counters that represent four man fire teams, two and three man machine gun teams, a Sagger team, and an SPG-9 team (68:106). The game also includes the employment of the following military vehicles: M-60 Tank, T-62 Tank, PT-76 Tank, M-113 Armored Personnel Carrier (APC), M-150 APC, Soviet BMP, Soviet BRMD, and a futuristic tank (68:106). The game has three levels of complexity with each level adding to or modifying the basic rules to include more realism. The game was dropped by the Army as being too complicated for play by its junior enlisted personnel (68:107).

4. Firepower - This game was published in 1984 by the Avalon Hill Game Company (AH) and depicts man-to-man combat in present time and recent past (7:1). The game includes the organization, weapons, equipment, and tactics of many of the world's nations since 1965 (7: Game Box). The game has four 8" by 22" mapboards that can be arranged in numerous configurations and the terrain can be varied from deserts to jungles or city blocks (7:1). The game depicts the following personal weapons: flamethrower, grenade

launcher, light machine gun, medium machine gun, medium portable launcher, mortar, pistol, rifle, and submachine gun (7:1). The game rules provide for several levels of complexity and includes squad organizations from over 50 different nations (8:15-25).

5. Fire Team - This is a new game recently published by West End Games (43:19). It depicts modern conventional warfare in Europe between US and Soviet forces and is played at the squad level (43:19). The game covers almost all facets of modern infantry and armor warfare with the rules addressing helicopters, artillery, fortifications, and advanced fire control (43:19). The game features the latest in modern weaponry and is believed by critics to be the most realistic, up-to-date playable squad level game on the market (43:19).

6. Fulda Gap - This game was published by Simulations Publications, Inc. (SPI) and features battalion size combat operations in a hypothetical war in Europe in the "central front" area through the Fulda Gap (the closest point of the East German border from the Rhine) (38:215). The game also involves electronic warfare activities and pits a NATO mobile defense against a multi-echelon Soviet attack (71:151). The game includes rules for special types of problems which are expected to be encountered in such a future war (38:215). While this game initially appears to be outside of the scope of an ABGD game it may provide some

valuable insight as to how game designers treat Soviet tactical operations.

7. Main Battle Area - This game is published by Omega Games and depicts realistic modern combat at the battalion and regiment level between US and Soviet forces (70:2). The game covers dismounted infantry, planning, command and control, doctrine, tactical air support, engineer operations, and chemical warfare (70:2). The game has four levels of play so that players can choose the degree of difficulty and realism they want. The game is advertised as having been designed by US Army infantry and armor officers (70:2).

8. Ranger - This game is published by Omega Games and features a simulation of ranger type operations (70:2). The game utilizes a four color laminated game map and a Tactical Events Booklet which covers fifteen scenarios including: raids, ambushes, and reconnaissance missions; airborne, airmobile, and small boat operations; and unexpected enemy contact (70:2). The game is designed to allow the players to experience the types of decisions that ranger patrol leaders have to make in various tactical situations. The game is advertised as having been designed, developed, and playtested by US Army Rangers (70:2).

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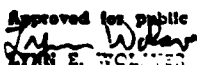
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→ This study explored the possible use of a board wargame as a device for training Air Force Security Police (SP) air base ground defense (ABGD) forces. The study had three objectives: (1) Determine current SP combat missions and the types of threat forces they are likely to engage. (2) Determine the nature, components, and uses of wargames. (3) Identify the variables needed to model ABGD combat effectively.

Soviet and US operational doctrine and tactical concepts were analyzed to examine the potential future combat environment in which ABGD forces may have to operate. Components of wargames and game design systems were reviewed to determine those that needed to be included in a successful game design. A historical examination of wargames determined that wargames have been successfully used in the past for training and testing of operational plans. These two phases were integrated, and an analysis identified tactical implications pertaining to the threat forces that ABGD forces may be facing in a future conflict. The review also identified game design considerations that would inject reality into the simulation device. (Theses). ↗

This study concluded that a wargame can be an effective training device if designed properly. The first step in a successful game development process is identification of the proper variables in the combat environment to be simulated. These variables must then be translated into game design language which will yield the required effects to simulate modern combat. This part of the process includes all the considerations which ensure the game is played properly and is interesting to the players. The more realism depicted in a game, the more complex the game is. The balance between warfighting realism and game playability was found to be crucial.

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